



FACULTY OF EDUCATION
DEPARTMENT OF EDUCATION AND SPECIAL EDUCATION

GARDEN-BASED LEARNING IN A REGGIO EMILIA INSPIRED SWEDISH PRESCHOOL WITH A PERMACULTURE GARDEN

A case study

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Supervisor:	Dawn Sanders
Examiner:	Elisabet Öhrn

Abstract

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- Aim:** This study aims to get an in-depth understanding of the characteristics of the garden and garden-based learning in an educational environment of a Swedish preschool that is inspired by the Reggio Emilia approach and has a permaculture garden.
- Theory:** Social constructivism has been adopted as the theoretical framework for this study to gain an understanding of learning processes in the environment of a preschool. The theoretical perspective supported the interpretation and discussion of the research findings.
- Method:** This study is a qualitative case study that is informed by the constructivist research paradigm. The case study is designed as a single-case study with the rationale of an unusual case (Yin, 2018). Observations, interviews, photography, and research diary were applied as data collection methods. 11 pedagogues were interviewed through semi-structured interviews. The findings from observations, photography, and research diary have been analysed simultaneously to the research process, which was essential for formulating the interview questions. The interviews have been transcribed and in the first instance they have been analysed inductively, from the ground up. Afterwards, the transcripts have been coded with NVivo, a data analysis programme, which lead to 83 codes that were merged into seven themes.
- Results:** The research findings indicate that the preschool garden becomes a meeting place, a changeable environment, a place of well-being, and a living-learning environment. Further, the findings suggest that teaching and learning in the garden and with its materials become a co-construction between children and pedagogues. Also, learning becomes experiential learning with all senses and an active and contextual driven process for both, the children, and pedagogues. Teaching becomes guiding and co-construction instead of instruction. Garden-based learning in the environment of a preschool requires curiosity, knowledge, a will to try and learn, and responsiveness towards the garden and the children from the pedagogues. Challenges of garden-based learning emerging in the study are the coordination between the work with and the needs of the children and the garden, and the utilization of the garden as an additional learning environment.

Foreword and Acknowledgements

This thesis is the result of a long journey that taught me to be patient with myself and my acquisition of knowledge. What helped me along this journey, besides my intrinsic motivation, were interactions with humans, nature, and literature. During the task of reflecting on my reading biography in the third term of the IMER programme I stumbled across a quote by the character of Beppo, a street sweeper from Michael Ende's story *Momo*. Beppo explained:

“...it's like this. Sometimes, when you've a very long street ahead of you, you think how terribly long it is and feel sure you'll never get it swept. And then you start to hurry. You work faster and faster and every time you look up there seems to be just as much left to sweep as before, and you try even harder, and you panic, and in the end you're out of breath and have to stop - and still the street stretches away in front of you. That's not the way to do it. You must never think of the whole street at once, understand? You must only concentrate on the next step, the next breath, the next stroke of the broom, and the next, and the next. Nothing else. That way you enjoy your work, which is important, because then you make a good job of it. And that's how it ought to be. And all at once, before you know it, you find you've swept the whole street clean, bit by bit. What's more, you aren't out of breath. That's important, too...” (Michael Ende, 1973)

So, one of my acknowledgements goes to Michael Ende for creating such a wise character as Beppo, reminding me to take one step at a time.

Further, I want to thank all the pedagogues involved in this study. I feel deeply grateful for having been welcomed warmly into their preschool environment. The pedagogues' openness and reflectiveness made it possible to get a deep insight into garden-based learning in the preschool and made this study become what it is. Further, I am thankful for experiencing the inspiring environment of the preschool garden. This experience had and still has a sincere effect on my personal gardening experiences.

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1. INTRODUCTION

Can we take every child into the wilderness? Maybe, but only occasionally! Can we take every child into the garden? Most certainly and daily! (Desmond et al., 2004, p. 77)

This introducing quotation by Desmond et al. (2004) is inspiring and motivating at the same time as it evokes questions. According to Desmond et al. (2004), a garden is a place that can most certainly be visited daily by children, in comparison to the wilderness. It is further stated that garden-based learning “has been viewed as contributing to all aspects of basic education, including academic skills, personal development, social development, moral development, vocational and/or subsistence skills, and life skills” (Desmond et al., 2004, p. 30). Additional literature, the literature reviews by Blair (2009) and Williams & Dixon (2013) underline those benefits like a positive impact on academic outcomes as well. However, both Blair (2009) and Williams & Dixon (2013) also discovered difficulties with the methodologies and validity of the studies they reviewed.

School gardens have a long history in Sweden (Åkerblom, 2005), but they are still not common (Almers et al., 2018). The contradiction that becomes apparent is: If it is possible and most likely beneficial for the child to take it into the garden daily why don't we do it then? Desmond et al. (2004) ask, “why has the pedagogy not become institutionalized in the educational mainstream?” (p. 30). They describe three main reasons for garden-based learning (GBL) not being mainstream: “One is that the pedagogy has not been critically examined and endorsed by educational researchers and practitioners. A second is that there is no developed discipline in GBL that makes the connection to PBL [project-based learning], effective experiential education, and advancement in academic performance. [...] Finally, there is often no local strategy to sustain the physical plant of the garden site as a permanent part of the school or programme facility.” (Desmond et al., 2004, p. 30)

Garden-based learning could be defined “simply as an instructional strategy that utilizes a garden as a teaching tool” and its “pedagogy is based on experiential education, which is applied in the living laboratory of the garden” (Desmond et al., 2004, p. 20). However, Desmond et al. (2004) argue that such a simple definition is misleading, and it does not take the powerful elements of the garden experience into account. They state further that the definition “overlooks the relationship of these experiences to educational reform and to the transformation of contemporary basic education from a sedentary, sterile experience to one that is more engaging of the whole child” (p. 20). Therefore, Desmond et al. (2004) demand more research and they state that “the analysis of the experiences of unique educational environments such as schools of Reggio Emilia and Waldorf Schools” might contribute to the understanding of GBL (Desmond et al., 2004, p. 71).

The search for and review of relevant literature indicates that the interest in garden-based learning, also in the obstacles of it, has been increasing in the last decade. The reviews of the literature reveal that a main challenge that practitioners face is the implementation of the school garden into the curriculum or vice versa. In contrast, one study (Sloan, 2014) demonstrated that teachers transformed their teaching by experiencing gardening activities and connecting emotionally to the garden. Further, similarly to Desmond et al. (2004) and Sloan (2014), research results show that gardens are seen as a key for educational

transformation by practitioners (Almers et al., 2018; Eugenio-Gozalbo et al., 2020). For instance, the garden is viewed as a place that has a child-centred potential where children can “do self-directed learning” (McMillen et al., 2019, p. 401). However, it is still unknown how the elements of the garden and the experiences in and with it relate to the pedagogical work in a Reggio Emilia inspired school.

Consequently, this study aims to get an understanding of the characteristics of the garden and garden-based learning in an educational environment of a Swedish preschool that is inspired by the Reggio Emilia approach. At the beginning of the research process, the overall research question was: What is going on in the preschool, in and with its garden? (Inspired by Jørgensen, 2014). Initially, it was planned to focus the research on observations in the preschool with a focus on the interaction between children, pedagogues and the garden or garden materials. However, the growing Covid-19 pandemic in 2020 led to changes and consequently altered the research study. Thus, the focus of the research changed towards the pedagogues’ perspective of garden-based learning. Consequently, the research study assesses the perspectives of pedagogues at a Swedish preschool that is inspired by the Reggio Emilia approach and has a permaculture garden.

The research study addresses the following research questions:

- a) What becomes the preschool garden?
- b) What becomes teaching and learning?
- c) What does garden-based learning require from the pedagogues?
- d) What are the challenges of garden-based learning?

The research study is designed as a single case study with constructivism as the research paradigm. Considering that according to the constructivist research paradigm, theory “should not precede research but follow it” (Cohen et al., 2011, p. 18), social constructivism has been established as the theoretical framework after a first inductive analysis of the data. Further, various data collection methods have been utilized in the conduction of this study, such as observations, interviews, photography, and a research diary.

The thesis is structured as follows: after the introduction, the literature review will present the results of research studies focusing on school gardens and garden-based learning. Barriers, factors of success and teachers’ experiences of garden-based learning will be analysed. Afterwards, social constructivism as the theoretical framework will be discussed.

Chapter four consists of the methodological framework, where constructivism and case study will be presented and the choice for case study as a research method will be discussed. Further, the chapter involves information about the data collection procedure and utilized methods, such as observations, interviews, photography, and research diary. Moreover, the data analysis, limitations, and ethical considerations will be described in the fourth chapter.

In the fifth chapter, background information about the preschool, the Reggio Emilia approach, and permaculture will be discussed, before presenting the research results in chapter six. Thereafter, the results of the research will be discussed in chapter seven. In the

final chapter eight, conclusions from the research study will be drawn and recommendations for further research will be presented.

2. LITERATURE REVIEW

The literature review seeks to develop a better understanding of garden-based learning from the perspectives of practitioners. Hence, teachers’ experiences and perceptions of garden-based learning as well as its experienced barriers by practitioners are in focus. The following two questions guided the review of the literature:

- 1) What are the barriers and factors of success for implementing and sustaining school gardens?
- 2) How do teachers experience and perceive garden-based learning?

With the first question, general barriers and factors of success have been analysed. I am aware that the ground for these findings is amongst other teacher’s experiences. However, the second question aimed to identify experiences and related factors in-depth. However, both questions were essential to help understand garden-based learning. The reviews indicate that practitioners of garden-based learning must face numerous and diverse barriers like lack of time, funding, knowledge, and the difficulty to include garden-based learning into the traditional school curriculum. Further, the garden is perceived as a place for experiential learning and practical activities. Also, perceptions depend on experienced barriers and the focus of teaching.

The following table gives a brief overview of the results of the literature review according to the two above mentioned questions.

TABLE 1 OVERVIEW RESULTS OF THE LITERATURE REVIEW

1. Barriers and factors of success	2. Teachers’ experiences and perceptions
lack of funding and time	childhood experiences and interest in gardening
school curriculum	experiential learning and practical work
staff – interest and knowledge	between curriculum, child, and the garden
community	gardening and educational transformation
location	engaging the community
summer holidays	

2.1 METHODOLOGY

In the first instance, selection criteria and search parameters for this review have been determined. Those have been the following:

- empirical research studies on garden-based learning and school garden focusing on barriers and teachers experiences and perceptions
- publications between 2005 and 2020

- international studies (articles, master thesis, and doctoral dissertation) published in English

The time of publication between 2005 and 2020 has been chosen since most recent research published after the work of Desmond et al. (2004) was supposed to be included in the literature review. Firstly, the search has been conducted in the database of the Library of the University of Gothenburg. Secondly, the database of ERIC – Education Resources Information Center has been used for crosschecking. Keywords and Boolean operators for the search were garden-based learning OR school garden. Additionally, hand searches have been conducted in the Early Childhood Education Journal and the European Early Childhood Education Research Journal. The titles and abstracts of nearly 300 articles have been scanned. Exclusion criteria were missing research content, nutrition, solely focus on students’ experiences and academic outcomes. After exclusion, the corpus of this literature review consisted of 24 empirical studies. Unfortunately, one article that might have been beneficial to the literature review was not accessible (Selmer, S.J., Luna, M.L., & Rye, J.L. (2015). Insights into Teachers’ Experiences Implementing Garden-Based Learning: Characterizing the Relationship Between the Teacher and the Curriculum. *Teachers College Record*, 117(9), 1-36.)

I oriented the reading and analysis of the studies on the EEECA model and its approaches to examine, evaluate, establish, compare, and argue (Jesson et al., 2012, p. 48). Through the processes of analysing and comparing the empirical studies, the earlier mentioned themes (results) emerged. These results are presented in depth and discussed in the following.

2.2 BARRIERS AND FACTORS OF SUCCESS OF GARDEN-BASED LEARNING

Burt et al. (2018a) state that “any school garden can become well integrated with adequate funding” (Burt et al., 2018a, pp. 851-852). Indeed, a *lack of funding* is reported in several studies as a barrier to either implementing or sustaining a school garden (Browder, 2020; Burt et al., 2018a; Burt et al., 2018b; Burt et al., 2019; Dawson et al., 2013; Diaz et al., 2019; Loftus et al., 2017; Plaka & Skanavis, 2016). Burt et al. (2018a) focused their research on the relationships between individual integration characteristics and budget in elementary schools in New York (USA) and they discovered that budget was positively and significantly related to partner organizations and physical space. Thus, from this relational perspective funding seems to be the crucial factor for implementing and sustaining school gardens.

On the contrary, Benjamin-Neelon et al. (2019) who assessed barriers for growing fruits and vegetables for nurseries in England found that the main barriers reported by practitioners were space, expertise, and time, whereas the factor of cost was only reported by an insignificant amount of practitioners. Further, Eugenio-Gozalbo et al. (2020) focused their research on key issues of garden-based learning for university practitioners in Spain and they noticed that gardens demand coordination between different actors, that teachers often must take the lead alone, and that they lack institutional support and legitimation. Funding was not mentioned explicitly as a key issue in Eugenio-Gozalbo’s study, though it might be included in the concept of institutional support. Unfortunately, it remains unclear if it is part of the concept. Diaz et al. (2019) conducted a three-round online survey (Delphi technique) with

school garden experts in Florida (USA). After the third round, they discovered eight main obstacles for school garden program success and lack of funding was not one of those eight obstacles. However, it was still included in round two with 63,6%. Some of the barriers the participants in the study mostly agreed on were lack of time among teachers, lack of continuity of maintenance, volunteer management and retention, lack of continuity in leadership, integrating an innovative program into an existing traditional classroom system, lack of initial and sustained participation (Diaz et al., 2019, p. 202).

The obstacle of *lack of time*, as observed by Benjamin-Neelon et al. (2019) and Diaz et al. (2019), was noted by further studies (Browder, 2020; Burt et al., 2018b; Burt et al., 2019; Dawson et al., 2013, Loftus et al., 2017; Moriearty, 2018). Burt et al. (2018b), who conducted an online survey with school gardeners from 15 states in the USA, ranked time as the greatest barrier to integrating and sustaining school gardens. The aspect of time included mainly a lack of time for students to use the garden and a lack of time for staff training. Besides time, curriculum and staff were noted as obstacles in the same study.

Burt et al. (2018b) mentioned a difficult integration of the school garden into the *school curriculum* as an obstacle (p. 1545). Further curricular issues reported were “curriculum design, classroom management, and student engagement” (Burt et al., 2018b, p. 1545). Likewise did Diaz et al. (2019), as already mentioned above, find out that the integration of an innovative program into the traditional classroom system seems to be an obstacle for integrating school gardens. Further, they got the response that “managing a classroom outside in the garden is challenging” and that there is a “lack of existing curricula that promotes garden-based activities” (Diaz et al., 2019, p. 201). Further, Loftus et al. (2017) noticed that school administrators’ interest in establishing an edible garden would increase if “prepared lesson plans were provided” (p. 510). Moreover, the need for lesson plans was also noticed by Greer et al. (2019) and Jorgensen (2014).

Further, the barrier of *staff* was found by several studies (Burt et al., 2018b; Diaz et al., 2019, Loftus et al., 2017, Dawson et al., 2013). Burt et al. (2018b) noticed that “the greatest staffing challenges were an inadequate number of volunteers and a lack of teacher interest” (p. 1546). Correspondingly, McMillen et al. (2019), who researched preschool teachers’ perceptions of sustainable education of garden education, noticed that “participants indicated that someone with interest and comfort in nature needs to show initiative to get the preschool garden started and if that person is not identified, the preschool garden might not get started or be sustainable” (p. 398). Further, Diaz et al. (2018) discovered a “lack of initial and sustained participation among parents, students, volunteers and teachers” as a barrier for school gardening (p. 202). The aspect of the *involvement of volunteers and community* seems to be critical for the success of school gardens since it is stated by further studies as a barrier and crucial to school garden success (Benjamin-Neelon et al., 2019; Browder, 2020; Burt et al., 2019; Dawson et al., 2013; Loftus et al., 2017; McMillen et al., 2019; Plaka & Skanavis, 2016). Burt et al. (2019), who researched predictors and barriers of school garden success in 38 states in the USA and Puerto Rico through an online survey, found that “the only barrier significantly related to success was community interest” (p. 1142). Additionally, Townsend et al. (2012) state that a community and especially volunteers are crucial for the establishment and ongoing sustainability of the kitchen garden program which they researched.

Teacher knowledge is described by several studies as a further barrier or factor of success for garden-based learning (Browder, 2020; Greer et al., 2019; Kincy, 2016; McMillen et al., 2019; Plaka & Skanavis, 2016). For instance, Kincy (2016) performed a quantitative survey to investigate elementary school teachers' likelihood to use school gardens and they noticed that school gardens are more likely to be successful if teachers who have experience and knowledge in gardening serve as mentors. This perception is supported by Browder (2020). Early childhood teachers interviewed by Browder (2020) stated that they struggle "with a lack of knowledge on growing things" and that they either needed to learn more or needed support from gardening experts (p. 54). Moreover, some studies identified the need to coordinate garden activities between for example teachers and volunteers as an obstacle for sustaining school gardens (Eugenio-Gozalbo et al., 2020; Greer et al., 2019; Jorgensen, 2014; Moriearty, 2018; Somerset & Bossard, 2009). Jorgensen (2014) describes garden coordinators as an incentive to implement and sustain school gardens.

The *location* can also be a barrier to implementing and sustaining a garden. Burt et al. (2019) report that the "location in a rural region [...] had a negative impact on success" (p. 1142). Similarly, Loftus et al. (2017) noted that "large cities were more likely [...] to have schools with edible gardens, and large towns were more likely than small towns and rural areas to have such a garden" (p. 511). Correspondingly, "rural school administrators were more likely than those of large cities" to identify the availability of paid staff as a significant barrier (Loftus et al., 2017, p. 511). On the contrary, Burt et al. (2018a) determined independent predictors of integration of school gardens in New York City and they found that "school location is not related to integration score" (Burt et al., 2018a, p. 853). Additionally, the research study by Somerset & Bossard (2009), indicates climate as a possible obstacle for using school gardens. Somerset & Bossard (2009) determined the "prevalence of and usage of food gardens in primary schools in three distinct climatic regions of north-eastern Australia" (p. 1485).

Another obstacle noted by several studies can be the *summer holidays* (Almers et al., 2018; Burt et al., 2018b, Greer et al., 2019; Loftus et al., 2017). Loftus et al. (2017) state that "an often-repeated concern was the timing of garden maintenance and harvest activities in comparison to school session; most garden work must be done in the very same months that schools are out for summer break" (p. 509). The same obstacle is mentioned in Swedish research as well. Almers et al. (2018) stress that "the need for watering and weeding during summers, when teachers are on summer break, is a significant barrier for many schools to overcome" (p. 244).

Consequently, the barriers and factors for school garden success are very diverse and connected. Their rating of importance seems to depend on the location where the research was undertaken. For instance, the aspect of *lack of space* seemed more critical to childcare centres in England and schools in New York (USA) than to schools in Illinois and Florida (USA). Almost all the studies that explicitly researched barriers to gardens and garden-based learning used surveys as their research method, despite one study that followed a qualitative approach with semi-structured interviews (Dring et al., 2020). Interestingly those studies did not mention funding and rather the lack of administrative support as obstacles. Further, Diaz et al. (2019) used the Delphi technique for their survey. They started with open questions, and the results showed that funding is an important aspect of school garden success, but that there

seem to be more important obstacles like time for managing and volunteer and teacher participation.

Hence, funding seems to be one important aspect to the success of school gardening, but as the research shows it is not the only one also if it is connected to other aspects like staff and time. Burt et al. (2018a) state that “greater financial resources may increase the integration of other components and decrease barriers” (p. 851). However, I consider their statement that “every school garden can become well integrated with adequate funding” (Burt et al., 2018a, pp. 851-852) even in a relational aspect as critical since it does not consider individual aspects such as location or teacher interest.

2.3 TEACHERS’ EXPERIENCES AND PERCEPTIONS OF GARDEN-BASED LEARNING

2.3.1 CHILDHOOD EXPERIENCES AND TEACHERS’ INTEREST IN GARDENING

Several studies indicate that the teachers’ interest in implementing garden-based learning depends upon others on their childhood experiences (Browder, 2020; Dring et al., 2020; Jorgensen, 2014; Kincy et al., 2016). For instance, Kincy et al. (2016) noticed that “previous life experience with gardens made a significant difference in whether a teacher had a stronger intention to use a school garden” (p. 146).

Yet, not only garden experiences can influence teachers’ interest in garden-based learning but also their general environmental memories. For instance, Jorgensen (2014) conducted in-depth interviews with primary school teachers and found that the teachers’ general environmental memories, like spending a lot of time outdoors, in combination with observation of today’s children’s behaviour are essential for doing garden-based learning. Namely, the interviewed teachers shared “that the children they see every day are dependent on electronic technologies for their entertainment, spend the majority of their time indoors, have short attention spans, have difficulty with invention, imagination, and creativity, and lack core strength and fine motor skills. In each case, these observations are clarified by references to how things were different when they themselves were children and students.” (Jorgensen, 2014, p. 127). These findings are supported by Browder (2020), who interviewed early childhood teachers and found that the characteristics of today’s young children and the teachers’ want to reconnect them to nature influence the teachers’ interest in garden-based learning.

Also, Jorgensen (2014) states that although the teachers’ “environmental memories and observations of children serve as a very strong rationale for using a school garden regularly, these things do not necessarily imply a pedagogical rationale. For this to happen, the garden must resonate with each teacher’s core beliefs about teaching and learning. Interview data indicate that this is the case, with each teacher appreciating the garden as a place for ‘hands-on’ and experiential learning.” (Jorgensen, 2014, p. 130)

2.3.2 EXPERIENTIAL LEARNING AND PRACTICAL WORK

The reviewed research studies indicate consent in noticing the opportunity of experiential learning in the place of a garden. For instance, Greer et al. (2019) interviewed elementary

school teachers and principals. The participants stressed that the garden can be a place for experiential learning where kids get “hands-on” experiences (Greer et al., 2019, p. 261). Further, it was noticed that the garden experience “makes learning meaningful” (Greer et al., 2019, p. 261). Similarly, Murakami et al. (2018), who interviewed early childhood teachers, noted that teachers viewed authentic participation in the garden work “as making the experience in the garden more meaningful to the children” (Murakami et al., 2018, p. 23). Moreover, they state that this “authentic participation in garden work, which might initially be perceived as too messy or challenging for preschoolers, was the central focus of gardening experiences that the teachers felt drove learning and development” (Murakami, 2018, p. 23).

Further, early childhood teachers describe sensory experiences that the garden provides as opportunities for learning and development. Murakami (2018) noticed that “garden experiences gave children the chance to smell, taste, feel, hear, and see new and interesting things” (Murakami, 2018, p. 26). Thus, teachers in this study perceived garden-based learning as experiential learning through hands-on activities with all senses.

The importance of practical work is stressed by further studies (Almers et al., 2018; Jorgensen, 2014; Malberg & Wistoft, 2018). For instance, Almers et al. (2018) interviewed forest garden teachers in Sweden, and they found that the teachers viewed practical work “to be important in making the children physically connected to the food production of the forest garden and in experiencing themselves as co-creators with other organisms” (p. 253). Hands-on activities can as well be seen as beneficial to human interactions since students and teachers follow a common aim like planting and harvesting, which has been noticed by Malberg & Wistoft (2018) who conducted a case study of the Gardens for Bellies program in Denmark. Further, one teacher in the research study of Greer et al. (2019) stated that being “able to participate in managing a garden, planting it and then harvesting it, will give them [the students] a better idea of things when they learn about photosynthesis, plant growth, life cycles, and things like that” (Greer et al., 2019, p. 261).

Consequently, the examples show the recognized importance of practical gardening activities by teachers, yet for different reasons. Practical activities are seen as important for the development of social interactions, for physical connection to nature and experience of co-creation with organisms, and curricular content learning.

2.3.3 BETWEEN CURRICULUM, CHILD, AND THE PLACE OF A GARDEN

The review of the literature indicates that teachers’ perceptions of garden-based learning, thus their intentions to implement garden-based learning depend upon the focus on and between curriculum, child, and the place garden.

Several sources reveal the use of *curriculum-focused practices* where the garden is seen as a tool for teaching (Eugenio-Gozalbo et al., 2020; McMillen et al., 2019; Sloan, 2014; Somerset & Bossard, 2009). For instance, Somerset & Bossard (2009), who interviewed primary school staff, noticed that “garden is seen as a tool to teach science, environment, or social skills” (p. 1485). Further, “teachers described the use of garden education as a unique opportunity to teach many subjects and ideas in one space, applying multi-curricular techniques” as noted by McMillen et al. (2019, p. 401). McMillen et al. conducted in-depth interviews with preschool teachers in the USA to explore their experiences and perceptions of incorporating garden education into a preschool curriculum.

Further, Jorgensen (2014) describes teachers' perceptions of the school garden being a place helping students to understand contents from the indoor classroom (curriculum). Hence, the garden space is as well seen as a tool for teaching the curricular contents. Yet, at the same time, it is seen as a place different from the traditional classroom, where children who struggle in the traditional classroom can be successful.

On the contrary, Greer et al. (2019) noticed the struggle of emphasis on testing. They state that "principals and teachers discussed how an emphasis on student test scores detracts from non-essential programming like school gardening" and one teacher stated that "no one is looking at how your students grow except by test scores" (Greer et al., 2019; p. 261). Further, directives from administrators are seen as a barrier to use the school garden. "Teachers discussed how testing-related mandates from administrators take priority over garden activities and squelch interest among teachers that might otherwise become involved in school gardening", they noted (Greer et al., 2019; p. 261). Therefore, this perception could indicate that the garden is not seen as beneficial for learning in the sense of what is needed to raise students' test scores.

Similarly, the contrast between the aims of administration and the child's learning, and the garden is also recognized by Jorgensen (2014). Namely, a teacher described the garden as a place "where the practices she feels most strongly about remain safe from administrative control" (Jorgensen, 2014, p. 130). Further, the teacher envisions the garden as a place to do experiments, she declared: "I want them [the students] to be interested and see things and wonder about them" (Jorgensen, 2014, p. 130).

The perception of the garden being a place to experiment and wonder, an engaging environment that gives the possibility to discover and observe, is detected by further studies (Almers et al., 2018; Eugenio-Gozalbo et al., 2020; Murakami et al., 2018; Remaklus, 2014; Wapenaar & DeSchutter, 2018). For instance, Remaklus (2014), who conducted a narrative inquiry following a Reggio Emilia approach in teaching pre-schoolers, noticed that the garden is engaging to children. This engaging character of the garden is confirmed by Murakami et al. (2018) who found that the teacher narratives "emphasized children's excitement, energy, and rich emotional experiences they had during trips to the garden" (p. 26). "This engagement may become a driving force to support learning and development", they elaborate further (Murakami et al., 2018, p. 26).

To follow children's interests and to give them the possibility to discover and experiment, was perceived as an essential part of garden-based learning by forest garden educators, university garden-based practitioners, and early childhood teachers. For instance, Almers et al. (2018) investigated ideas, experiences, and purposes of forest garden educators in Sweden, and they noticed that the educators view the garden as a space of freedom and experimenting, which can "contribute to broadened perspectives of what is possible" (Almers et al., 2018, p. 250). Further, one of the forest garden educators in the study stated that when "children are allowed to do different things, they also dare to do more things" and then "they can discern more possibilities to impact, which empowers them" (Almers et al., 2018, p. 250). Further, most preschool teachers in the study of McMillen et al. (2019) viewed discovery learning as "beneficial to preschoolers" (p. 401). The teachers articulated the child-centred potential of the garden, where the children can "do self-directed learning" (McMillen et al., 2019, p. 401).

Moreover, the forest garden educators in Almers et al. (2018) asserted that “it is essential for the children not to feel pressure to perform all the time” and that they should also “be allowed to just be, to observe, and to discover nature”. (Almers et al., 2018, p. 254). Similarly, a garden-based learning practitioner considered the garden as a place where leisure time can be spent, he stated: “We are devoting time to what we really want and we own our time (...) we celebrate a kind of leisure time which is creative and constructive and not taken up by consumption” (Eugenio-Gozalbo et al., 2020, p. 253).

2.3.4 GARDENING ACTIVITIES AND EDUCATIONAL TRANSFORMATION

Several teachers perceive gardening activities and experiences as beneficial for giving children an understanding of them being part of nature. For instance, a teacher of the Gardens for Bellies program, researched by Malberg & Wistoft (2018) stated that experiencing gardening and cooking activities can give “children a unique opportunity to understand how they as individuals are part of nature, and how they in sympathy with nature can get produce from their own garden” (Malberg & Wistoft, 2018, p. 1187). Another teacher underlined this perspective by saying “In Gardens for Bellies, we observe how the kids treat earthworms, salamanders, beetles and frogs carefully, how they care about their plants’ growth. Nearly all children gain a large sense of ownership of the garden, which they have nurtured for a whole season.” (Malberg & Wistoft, 2018, p. 1186)

Further, Almers et al. (2018) describe the forest garden as a system “where the parts cooperate and that the children themselves, through a small project, are part of this cooperation” (p. 254). One educator in the study stated that besides experiencing biodiversity in the forest garden they become active co-creators. “We also can experience that we ‘belong to nature’, we take care of, affect and get direct benefit from it, in terms of harvest” (Almers et al., p. 252). They elaborate further that “forest garden educators put the emphasis on forest gardening as a tool for developing holistic and systemic worldviews, including a concept of self, rather than as a means of acquiring specific skills” (Almers et al., 2018, p. 254). Almers et al. (2018) elaborate further that “forest garden educators underline the importance of enabling children to feel that they belong to a whole, with their whole person, being in the world as a physical, biological, psychological, and spiritual human being” and in the long run that “would contribute to sustainability”, they state (Almers et al., 2018, p. 254). The researchers conclude that the “embodied systems thinking is in the foreground for the forest garden educators”, instead of stressing outcomes (Almers et al., 2018, p. 255).

Similarly, during the focus-group discourse conducted by Eugenio-Gozalbo et al. (2020), university garden-based practitioners in Spain “embraced living processes and provide ways to engage students with food production, which was considered as transformative” (p. 252). A practitioner stated that “gardens are a key for educational transformation” since it “involves a will to change, and to understand that the way things are done in education can be improved” (Eugenio-Gozalbo et al., 2020, p. 252)

Moreover, Sloan (2014) who followed a phenomenological approach and interviewed and observed elementary school teachers, found that the teachers' interactions and experiences with the garden influenced “their pedagogical approaches and curriculum decisions” (Sloan, 2014, p. 157). He noted that a “school garden promotes the value of participants’ identifying with the role of being a co-creator by planting seeds, tending to the soil, composting green waste, pruning and maintaining the health of the plants, harvesting, sharing, teaching and

learning about natural relationships, and consuming the food while enjoying the flowers as a learning community” (Sloan, 2014, p. 156). The teachers fostered emotional connections with the plants through these experiences and “identified with their role in developing lessons and utilizing curriculum that built upon foundational environmental ethics, shared intergenerational knowledge, promoted interpersonal accountability that fostered emotional connections, and utilized place-based learning approaches that heightened participants’ sense of purpose and belonging within a learning community” (Sloan, 2014, p. 157).

Consequently, these examples show that the garden and garden-based learning inherit the possibility for educational change and transformation for both, teachers, and students.

2.3.5 ENGAGING THE COMMUNITY

Several studies indicate that garden-based learning is perceived as beneficial for building connections to the community (Eugenio-Gozalbo et al., 2020; Greer et al., 2019; Murakami et al., 2018, Townsend et al., 2012). To illustrate, Murakami et al. (2018) noted that teachers perceived the work between children, families, and community members while harvesting and the sharing of the harvest as an important learning experience for the children. “Being part of a community and working together” is seen as a “valuable piece of life” (Murakami et al., 2018, p. 26).

Moreover, Townsend et al. (2012) who evaluated a kitchen garden programme in Australia with the focus on volunteering, found that the programme improved the relationship between school and community and that this connectedness to the community was valued upon others by the teachers. Teachers also perceived the volunteers working in the programme as valuable for children’s learning since they provided further perspectives.

Accordingly, university garden-based practitioners perceived gardens as “school of participatory democracy, that is, real spaces where, on a small scale and with your closest community, you can put democracy into practice” (Eugenio-Gozalbo et al., 2020, p. 252)

2.4 DISCUSSION AND CONCLUSION

Ten of the 24 reviewed research studies focused their research on barriers or predictors of implementing and sustaining school gardens. Nine of those ten studies used quantitative (or mixed methods) like cross-sectional surveys. The results of those studies gave a good overview of possible barriers to implementing and sustaining school gardens like lack of time, funding, staff, community, curriculum, teacher knowledge and interest. On the other hand, the studies could not support a differentiated and practical understanding of the influence of individual factors like teacher interest, and teachers’ perceptions of using school gardens. In fact, the statement by Burt et al. (2018a) that “any school garden can become well integrated with adequate funding” (pp. 851-852) ignored these individual factors completely.

Twelve of the twenty-four studies focused on teachers’ experiences and perceptions of gardens and garden-based learning. The other two studies were case studies evaluating food garden programs (Townsend et al., 2012; Malberg & Wistoft, 2018). All the studies used qualitative approaches, like phenomenological or narrative approaches and observations and interviews. Six of these studies also noticed factors of success or barriers to garden-based

learning. Hence, the studies with data of in-depth interviews and observations can give a deeper understanding of the barriers detected by the quantitative research studies. However, since these studies are qualitative, they are not generalisable but can give a deep insight into participants understandings.

For instance, several studies in this literature review described the garden as an engaging environment. However, Hipkiss et al. (2020) noticed that materials in the garden can discourage children to participate in garden activities. In this case, it was earth on garden gloves that kept a child from participating. Such experiences have not been described by teachers in the reviewed studies. Hipkiss et al. (2020) used actor-network theory and social semiotics to review and analyse research data. They stress the importance to recognise the agency of materials in the garden and the effects on children.

The aspect of community and volunteers has been described as critical towards the implementation and sustainability of garden-based learning in the first part of the literature review. On the one hand, volunteers and connections towards the community seem to be necessary for maintaining and sustaining the garden. On the other hand, the implementation of the garden can lead to connections to the community and the involvement of volunteers, which is seen as beneficial for the children's learning. Thus, the community can be a barrier, effect, and benefit at the same time. However, the understanding that the implementation of a garden can in effect lead to building beneficial connections to a community might help to perceive the factor less as a barrier.

A critical factor of garden-based learning that has been perceived by teachers is the implementation of the garden into an existing traditional school curriculum. Also, the need to meet test scores has been described as distracting from garden-based learning. On the contrary, other teachers perceived the possibility of discovering and experimenting in the garden as beneficial for the children. Teachers who valued the possibility for discovery were mainly preschool teachers or forest garden teachers. The problem of integrating the garden into the school curriculum and the want for lesson plans for the garden has been perceived by schoolteachers and principals. Accordingly, the aspects of performativity, achieving, and stressing outcomes that most school systems inherit are critical towards garden-based learning since the garden is another, more unpredictable learning space than the traditional classroom.

However, the findings by Sloan (2014) indicate that teachers can have the capacity to create self-directed lesson plans for garden-based learning. For that to realize the teachers experienced the garden through gardening activities, made emotional connections, and transformed their teaching. Further, forest garden educators and university garden-based practitioners (Almers et al., 2018; Eugenio-Gozalbo, 2020) viewed garden-based learning as transformational and beneficial to “embodied systems thinking”.

Gerofsky & Ostertag (2018) describe the difference between curriculum and learning in the garden as the problem of the grid, which is “sorting of curriculum, students, resources, timetables and grades into charts and tables” (p. 174). They discuss, “how to swing or parkour the strict grid of schooling” (Gerofsky & Ostertag, 2018). The question remains unanswered, but what they asked for is if teachers can take different pedagogical approaches. For instance, they rhetorically ask, “Can we take a playful, artistic approach to old certainties

and structures, swinging and parkouring from them rather than accepting or rejecting binary formulations?” and “Are we capable of working across generations and differences, skillfully navigating the landscape in unexpected ways, to find delight, life-giving experiences, knowledge, participation and community as we traverse the school and city sideways and nap alongside the strict tempo of clock time?” (Gerofsky & Ostertag, 2018, p. 184).

As the reviews of the literature show, some practitioners perceive gardens as a “key for educational transformation” (Eugenio-Gozalbo et al. 2020, p. 252). However, only one study (Sloan, 2014) focused on the effects of teachers experiences and their learning in the garden on their pedagogical approaches. Desmond et al. (2004) argued that one reason that garden-based learning is not educational mainstream is that “the pedagogy has not been critically examined” (p. 30). It can be concluded that the pedagogy of garden-based learning has still not been critically examined. Further, only one research study, the narrative inquiry by Remaklus (2014), could be identified that had a relation to the pedagogical concept of Reggio Emilia. However, it was her inquiry project that was inspired by Reggio Emilia and not an approach to the whole school as an environment.

As stated in the introduction do Desmond et al. (2004) claim that “the analysis of the experiences of unique educational environments such as schools of Reggio Emilia and Waldorf Schools” might contribute to the understanding of garden-based learning (Desmond et al., 2004, p. 71). Consequently, the results of this literature review show that also today, sixteen years later, there is still a research gap on experiences of educational environments inspired by Reggio Emilia or Waldorf. Consequently, to contribute to a deeper understanding of garden-based learning and its pedagogy, further research needs to be conducted. Therefore, this research study seeks to provide a deeper understanding of the characteristics of a preschool garden and garden-based learning.

3. THEORETICAL FRAMEWORK

Social constructivism has been adopted as the theoretical framework for this study to gain an understanding of learning processes in the environment of a preschool. On the one hand, the theoretical perspective will later help to interpret and discuss the findings. On the other hand, the results of the case study might “shed empirical light on some theoretical concepts and principles” (Yin, 2018, p. 38). Moreover, according to Yin (2018), an analytic generalisation of research results could lead to verifying, modifying, rejecting, or promoting theoretical concepts.

According to Adams (2006), social constructivism “is not a single unified theory either of knowledge or pedagogy” (p. 243). He claims that an abundance of constructivist theories can be found in the literature. However, what these theories have in common is that “the nature of the learning environment is one of experimentation and dialogue, where knowledge is seen within the context of problems to be discussed and solved” (Adams, 2006, p. 245). The following description of social constructivism is oriented on Adams’ (2006) argumentation and will focus on what a social constructivist position means for learning and teaching, thus the pedagogy.

The position of social constructivism emphasises the role of the social environment for the construction of knowledge. Like constructivism social constructivism views learning as a “process of active knowledge construction” (Woolfolk, 1993, as cited in Adams, 2006, pp. 245-46). However, the construction of knowledge is seen as “the product of social interaction, interpretation and understanding” (Vygotsky, 1962, as cited in Adams, 2006, p. 245). Consequently, the interaction and communication between individuals are central to learning within the concept of social constructivism.

Accordingly, knowledge is constructed between subjects and the consent between them is “the ultimate criterion upon which to judge the veracity of knowledge” (Adams, 2006, p. 246). Hence, from this perspective, there is no absolute rightness and learning is about personal interpretation that is predictive valid “within the mediated social environment” (Adams, 2006, p. 246). Thus, for the learning process, students must be “enabled to access those elements of learning that support the development of social interpretation” (Hein, 1991, as cited in Adams 2006, p. 246). “Through an appreciation of thought processes, cognitive conflict and socially appropriate predictive ability, learning [...] becomes personal interpretation, question creation and the appreciation of validity as defined by socially recognizable and appropriate forms” (Adams, 2006, p. 246).

According to Adams (2006), social constructivist learning aims to get to know the realities of other people in relation to one’s own reality. Consequently, a variety of propositions are acceptable since the “knowledge constructed is an indication of how the world might be” (Adams, 2006, p. 246). Further, teaching in that sense needs to focus on “the learner and not the subject matter to be taught, whilst simultaneously recognizing that there is no knowledge independent of the meaning attributed to experience by the learner within the learning community” (Hein, 1991, as cited in Adams, 2006, p. 246).

Consequently, social constructivist pedagogy does not focus on performance and rather on learning, where students are engaged in tasks that have an implicit value, that are ends in themselves. Further, learners are viewed as active co-constructors, who should “be given time to talk, with the teacher’s role that of listener and observer” (Adams, 2006, p. 249). Thus, within the social-constructivist position, the teacher-learner relation is based on guidance and not instruction. The teacher is “working to provide students with opportunities and incentives to construct knowledge and understanding” (Adams, 2006, p. 250). These learning opportunities are focused on the students and provide “pupil-world, case-based learning to enable authentic, context-oriented, reflective practice within a collaborative and social environment” (Adams, 2006, p. 250). Also, within the social-constructivist positions assessment helps to uncover a shared understanding. It “is non-judgemental, yields insights into understanding and prompts meta-cognition” (Adams, 2006, p. 250).

Finally, knowledge within the social-constructivist epistemology is not an objective discovery without any context, but a “contextually-driven intrapersonal creation” (Adams, 2006, p. 254).

4. METHODOLOGICAL FRAMEWORK

4.1 RESEARCH PARADIGM

For a research study it is important to explore the research paradigm and the position of the researcher since it will guide the methodology of the research (Guba & Lincoln, 1994). Overall, this study is based on an interpretative research paradigm. Working with the interpretative research paradigm, researchers begin “with individuals and set out to understand their interpretations of the world around them” (Cohen et al., 2011, p. 18). More precisely, the study is guided by the constructivism paradigm.

The constructivism philosophical paradigm can be described as “an approach that asserts that people construct their own understanding and knowledge of the world through experiencing things and reflecting on those experiences” (Honebein, 1996, as cited in Adom et al., 2016, p. 3). A researcher working with the constructivism paradigm “seeks to understand a phenomenon under study from the experiences or angles of the participants using different data collecting agents” (Adom et al., 2016, p. 5). Thus, this study aims to explore and understand the phenomenon of garden-based learning in a preschool working with a permaculture garden through the individual experiences of the preschool pedagogues. Further, within the constructivism paradigm meanings are also constructed through the researcher’s experiences in the study. Ultimately, from the perspective of the constructivism paradigm, “reality is subjective because it is from the individual perspectives of participants engaged in study and are thus multiple and varied” (Adom et al., 2016, p. 5).

According to Adom et al. (2016), “research grounded in the constructivism philosophical paradigm mostly begins with an open-ended inquiry through research questions” and “valid conclusions are then constructed from the findings” (p. 5). Further, “from the perspective of the interpretative research paradigm the hope of a universal theory which characterizes the normative outlook gives way to multifaceted images of human behaviour as varied as situations and contexts supporting them” (Cohen et al., 2011, p. 18). Hence, theory “should not precede research but follow it” (Cohen et al., 2011, p. 18). Therefore, the above discussed theoretical framework has been selected after getting familiar with the research data.

Consequently, the theoretical framework is informed by the place of the preschool garden. Beyond, also the four final research questions are informed by the place itself, the observations, conversations, and reflections within and about the preschool garden.

4.2 RESEARCH METHOD

Case study has been chosen as the research method to understand garden-based learning in a preschool with a permaculture garden. Yin (2018) states that a “primary distinction in designing case studies is between *single*- and *multiple*-case study design” (p. 49). He argues, that if possible multiple- or two-case studies should be preferred over a single-case study since the “analytic benefits from having two (or more) cases may be substantial” (p. 61). However, Yin (2018) also asserts that “the rationale for single-case designs cannot usually be satisfied by multiple cases” (p. 54). Following Yins’ argumentation, this case study is

designed as a single-case study with the rationale of an unusual case. As stated earlier, school gardens are not common in Sweden and research is rare. Accordingly, I consider a preschool with a permaculture garden and having Reggio Emilia approach as an underlying pedagogic as unusual, although the institution of a preschool itself is not unusual.

However, before deciding on the research method different options have been explored. In consideration of transparency of my decision making, I will briefly discuss why narrative research or phenomenology have not been used as research methods, although they could have been possible options.

According to Creswell, narrative research explores the lives of individuals with a need “to tell stories of individual experiences” (Creswell & Poth, 2017, p. 104). Phenomenological studies on the other hand focus on understanding the essence of an experience and the need “to describe the essence of a lived phenomenon” (Creswell & Poth, 2017, p. 104). Case study focuses on the development of an “in-description and analysis of a case or multiple cases” and provides an “in-depth understanding of a case” (Creswell & Poth, 2017, p. 104). Similarly, Yin (2018) describes case study as “an empirical method that investigates a contemporary phenomenon (the “case”) in depth and within its real-world context, especially when the boundaries between phenomenon and context may not be clearly evident” (p. 15).

This study aims to explore and get an understanding of the characteristics of the garden and garden-based learning in a preschool with a permaculture garden through experiences and perspectives of the preschool pedagogues and research observations. Therefore, the focus of this study lies less on individual experiences and the storytelling of those. Rather, the emphasis lies on the phenomenon of the case of garden-based learning in a preschool. Accordingly, narrative research has not been the preferred method for this research study.

Teherani et al. (2015) describe the aim of phenomenology, as a description of the meaning of an experience. Further, they note that phenomenology focuses on “what was experienced and how it was experienced” (Teherani et al., 2015, p. 669). However, although the pedagogue’s experiences are important for answering the research questions, the nature and meaning of these experiences are not the focus of this study. The focus lies on an in-depth understanding of the phenomenon (the case) and therefore this research study is designed as a case study.

The case of this study is garden-based learning in a Swedish preschool with a permaculture garden. As referred to in the introduction, this study aims to answer the following four research questions:

- a) What becomes the preschool garden?
- b) What becomes teaching and learning?
- c) What does garden-based learning require from the pedagogues?
- d) What are the challenges of garden-based learning?

Consequently, the following data collections methods, analysis and further considerations are designed and based upon case-study design as a research method. The writings of Robert K. Yin (2018) and Svend Brinkmann and Steinar Kvale (2015) have been used as the main sources for designing the different elements of the research process.

4.3 DATA COLLECTION PROCEDURE

In the first instance, the decision had to be made if the research should focus on the institution of a school or preschool. Having the background of working as a teacher and special pedagogue in preschools I decided to focus on preschool environments. Further, the Reggio Emilia approach has its roots in childcare and preschool. Thus, so far, the approach is mainly adopted in preschool settings.

Secondly, since the study aims to explore and understand garden-based learning, the preschool needed to have a garden. Further, having German as my native language I considered conducting research in a German preschool. However, due to that I have been permanently residing in Sweden for a couple of years, I preferred the option of researching in Sweden.

Consequently, I searched for a preschool with a garden in Sweden. The necessity of adopting the Reggio Emilia approach was subordinate at that point in the research process. Simultaneously, I searched for preschools in Germany as backup options. A Swedish preschool working with the Reggio Emilia approach and having a garden has been found very soon after starting the search. In November 2019, the preschool has been contacted through a personal letter for the first time (appendix 1). The form of a letter has been preferred over a first phone call since I wanted to introduce myself and to give the pedagogues time to think if they wanted to be part of the research without passively forcing them. In December 2019, I talked to the pedagogue who was responsible for the garden on the phone and visited the preschool for the first time in January 2020.

During this first meeting, I talked to the pedagogue responsible for the garden who is also one of the founders of the preschool, and the preschool director. We agreed that I will send a short introduction letter (appendix 2) and that I will take part in a meeting with the preschool pedagogues in February 2020 to introduce myself and the research plan. During the meeting, the teachers received the research plan and informed consent (appendix 3). At that point in the research process, I planned on doing observations two days a week focusing on the interaction between children, teachers, and the garden. Therefore, I also prepared information sheets and informed consent for the parents and children (appendix 4).

It was agreed that I can come to visit the preschool two days a week with start in March 2020. The first four days I took part in the activities of four different groups of children. Unfortunately, the rest of the month I have been sick and because of the growing Covid-19 pandemic, I considered changing my research plans. I travelled to and from the preschool for several hours with public transportation and I realized that my research study was not worth the risk I would put on pedagogues, children and families while visiting the preschool for several hours a day. Instead, I decided together with the responsible pedagogue to conduct interviews with the pedagogues with the possibility of doing them outside and with a safe distance. Further, I went with the car to the interviews, which were conducted between the 20th of April and the 8th of June 2020. During this time 11 pedagogues were interviewed. Three of the 14 pedagogues at the preschool did not participate. On the 1st of July 2020, each pedagogue received the transcript of their interview via E-Mail.

4.4 DATA COLLECTION METHODS

Yin (2018) suggests that using multiple sources of evidence is beneficial for case studies, especially single case studies. The sources mentioned are documentation, archival records, interviews, observations, and physical artefacts. However, he also argues that “the use of multiple sources of evidence imposes a greater burden” (Yin, 2018, p. 129). Consequently, using multiple sources like observations, interviews, analysis of documents, physical artefacts, and archival records makes the data collection more time consuming and the researcher “will need to know how to carry out the full variety of data collection techniques” (Yin, 2018, p. 129).

However, regarding the feasibility of this study and with the assumption that three sources of evidence are sufficient for this study, documentation and archival records have not been considered as sources. The sources of evidence used in this case study are interviews, observations, and photographs. The latter is also considered as physical artefacts. Observations have been documented through field notes and photographs. The overall research process has been documented with the help of a research diary. Hence, this study adopted four data collection methods which are partly at the same time sources of evidence. Accordingly, the different methods and sources of evidence informed each other and thus were essential for conducting the research study. For instance, the observations did not only provide evidence for the final research results of this study but also informed the interview questions. The following figure visualizes this relational aspect and the four data collection methods.

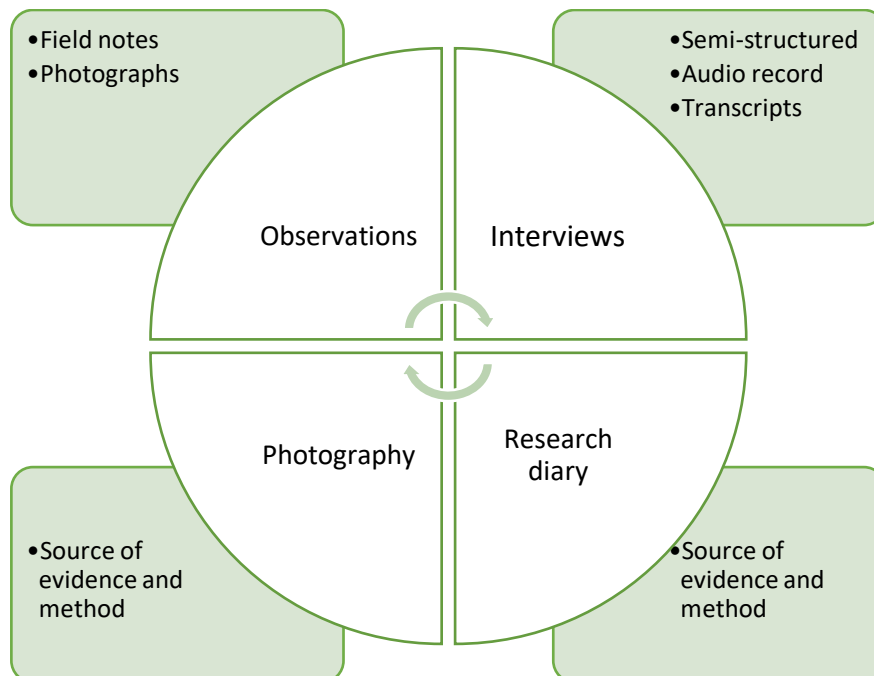


FIGURE 1 DATA COLLECTION METHODS

The data collection methods observations, interviews, photography, and research diary will be discussed in the following.

4.4.1 OBSERVATIONS

One research method that has been conducted is naturalistic observation. According to Cohen et al. (2011), the intention of naturalistic observations is “to observe participants in their natural settings, their everyday social settings and their everyday behaviour in them” (p. 465). In the case of this study, the observations focused on the pedagogues in the setting of the preschool. The observations were planned as non-participant observations. However, retrospective my role as a researcher shifted between complete observer and observer-as-participant, who is “not a member of the group, but who may participate a little or peripherally in the group’s activities, and whose role as researcher is clear and overt, as unobtrusive as possible” (Gold, 1958, as cited in Cohen et al., 2011, p. 457).

Due to the shift of the focus and process of this research study because of the growing Covid-19 pandemic in 2020, solely documentation of observations focusing on the pedagogues has been used for this study. Further, only a limited amount of documentation through observation was available for the data analysis of this study since observations of the pedagogues during their work could only be done on four occasions. However, the observations were essential for creating the frame for the interviews and supporting and strengthen findings from the interviews. Therefore, the observations were crucial to synthesizing the data and ensuring data triangulation.

The observations have been documented through field notes and photography. Field notes help the researcher to record an event and “inscribe social discourse, turning it from a passive event, existing only in its own moment of occurrence, into an account, which exists in its inscriptions and can be reviewed at a later time” (Gambold, 2010, p. 397). I took field notes simultaneously to observations. Consequently, the quantity of information that I could document in a certain situation is limited to my ability to observe and document at the same time. However, to keep the observed situations as natural as possible and to not intimidate the participants, audio or video recordings were not used. Further, photographs taken during observations focus solely on objects, for instance, plants, other natural materials, or tools used by the pedagogues. Later, I will discuss photography as a research method.

4.4.2 INTERVIEWS

Having the aim of this research study in mind, that is to gain an understanding of garden-based learning in a preschool with a permaculture garden, conducting qualitative research interviews with the pedagogues seemed plausible. Brinkmann & Kvale (2015) state that the “qualitative research interview attempts to understand the world from the subjects’ point of view, to unfold the meaning of their experiences, to uncover their lived world prior to scientific explanations” (p. 3). Hence, by using interviews this study attempts to explore and understand garden-based learning from the pedagogues’ point of view.

Further, it is noted that the research interview is an “inter-view, where knowledge is constructed in the inter-action between the interviewer and the interviewee” and “an interchange of views between two persons conversing about a theme of mutual interest” (Brinkmann & Kvale, 2015, p. 4). This perspective reflects the research paradigm of this

study where knowledge is constructed through the reflection of experiences. However, an interview as a research method is not purely a conversation, rather it is “a conversation that has a structure and purpose” (Brinkmann & Kvale, 2015, p. 4).

Consequently, I conducted semi-structured interviews with open questions. The questions have been constructed with substantial attention to the purpose of this study. Conclusions are drawn from literature e.g., the role of the community and missing information about the role of the garden for the pedagogues, but also from the observations had a crucial impact on the choice of interview questions. The questions have been intensely discussed with the supervisor and carefully changed and adjusted before conducting the first interview. After performing a pilot interview with one of the pedagogues one question has been adjusted. However, the content remained the same and only the wording had to be changed. Consequently, the findings through the interview have been evaluated as sufficient and the pilot interview is therefore also part of the research data.

Appendix 5 shows the final interview questions. Further, an additional interview with one of the founders and responsible for the garden of the preschool has been conducted (interview questions appendix 6). 11 pedagogues have been interviewed and the interviews lasted between 20 and 60 minutes. The interviews took place in person at the preschool, either inside the building or outside with a view of the garden. I audio recorded the interviews with the pedagogues' consents. Afterwards, they were transcribed and sent to the interviewees.

Regarding anonymity, I decided not to ask or share background information about the participants. For instance, it would have been interesting and beneficial for the study to compare the pedagogues' view of the garden and teaching depending on how long they have been teaching at the preschool. However, it was a conscious decision not to do that to not reveal the identity of the participants. Also, further information like age or gender does not seem relevant regarding the purpose of this study and the research questions.

4.4.3 PHOTOGRAPHY

Cohen et al. (2011) argue that photographs have “central place in educational research” (p. 529). Further, photographs were “traditionally thought of as portraying reality” (Holm, 2014, p. 5). However, it is argued that this is no longer the case and Holm (2014) acknowledges that they are constructed. Further, she states that photographs are “are taken in the sense that they give researchers the information and details they need, more like a record or a document, but the researcher also makes decisions on what to photograph and how to set it up and process it” (Holm, 2014, p. 5). Hence, the photograph becomes the “researcher's interpretation of “reality” that is considered important” (Holm, 2014, p. 8).

If the context that the photograph is taken in is well-known, the researcher can add stories to the photographs which can make them valuable for understanding research findings (Holm, 2014). At the same time, as Cohen et al. (2011) state, photographs can “carry meanings that words alone, be they spoken or written, cannot” (p. 529). Further, photographs can help to document “social transitions or change by identifying shifts in material objects, dress, and so on” (Mitchell & Allnutt, 2008, p. 267).

Consequently, in the foregoing described sense photographs have been taken and used for this study, as a source of evidence and as a research method. Photographs have been taken by

me as the researcher during observations or visits to the research site, the preschool garden. During the research process, the photographs have been used for reflection and for supporting and visualizing research findings. Accordingly, some of the photographs became part of the presentation of the research results. Beyond, the following photograph shows the preschool garden and is carrying meaning and feeling while visualizing the preschool garden that could not have been described with words in the same way.



PHOTOGRAPH 1 PRESCHOOL GARDEN FROM THE PERSPECTIVE OF ONE OF THE INTERVIEW SITES (JULY 2020)

4.4.4 RESEARCH DIARY

Diary writing can be “seen as an opportunity for reflection and inner dialogue” (Engin, 2011, p. 297). According to Engin (2011) do writers evolve during the research processes and reflection through a research diary as part of a dialogue with oneself “can be honest and open” (p. 298). Further, “researchers are often working alone, maybe geographically far from their University of study and their supervisors” (Engin, 2011, p. 299) and the diary becomes a place to share thoughts and document processes. Thus, the research diary can be “an integral part of [...] the construction of research knowledge” (Engin, 2011, p. 303).

Consequently, the research diary assisted me to document thought processes and reflect on these at a later point of the research process. In fact, the research diary helped me to document and reflect on difficulties during interview situations. For instance, when conducting interviews with the pedagogues the second time I wrote in the research diary:

Feel like I want that certain contents repeat themselves → be cautious about it, don't force it!
(Research diary, entry 27th April 2020)

Diary entries like this helped me to reflect on foregoing interview situations and to be more cautious about my intentions during following interviews.

Further, after several interview occasions, I wrote down my feelings and thoughts, which document a change in my self-conception as an interviewer and researcher. Engin (2011) notes in this regard, “the opportunity to re-read and interact with my thoughts was also a strong mediator in understanding my role of researcher and the research process” (p. 303).

*Nervous → glad that it was possible, felt very positive but also a bit unsure about myself, what do I say? Do I say too much?
(research diary, entry after first interview, 20th of April 2020)*

*Less nervous [...]
afterwards positive feedback, good questions → feels so important to me to have a good relation and also to give sth. of what I get back
→ important that the teachers feel comfortable during the interviews
(research diary, entry after second interview occasion with three interviews, 27th April 2020)*

*When coming home I talked [...] about how I liked doing these interviews and that I hope I can analyse and bring it to paper in a way that contributes, that is inspiring for other teachers
(research diary, entry after fourth interview occasion, 25th of May 2020)*

However, reflecting on the latter entry also contributed to the identification of possible researcher bias when stating that “I hope I can analyse and bring it to paper in a way that contributes”. It helped me to be more cautious and critical when conducting the data analysis. Consequently, beyond being a data collection method the research diary also became a source of evidence that helped to reflect on the research process.

4.5 DATA ANALYSIS

Firstly, the data from observations, field notes, photographs, and research diary have been analysed simultaneously to the research process. Hence, this data was beneficial for creating the interview questions, but also for synthesizing the data from different sources later in the research process. The analytic strategy for analysing the data from observations and research diary in a first step was to search “for patterns, insights, or concepts that seem promising” (Yin, 2018, p. 167). Thus, *curiosity of the pedagogues* and *change of the environment* appeared as the first themes through this analytic strategy. However, the data rarely occurred and often derived from single occasions. Consequently, the findings from observations would not have been sufficient evidence for this case study.

Secondly, the interviews have been transcribed which is also viewed as an analytic process. Brinkmann & Kvale (2015) state that transcribing “interviews from an oral to a written mode structures the interview conversations in a form amenable to closer analysis and is itself an initial analytic process” (p. 206). Accordingly, the transcripts were not only essential for the structured analysis of the data but also for getting familiar with the interview contents. The interviews were conducted and transcribed in Swedish. Further, the analysis was performed in Swedish. However, themes and citations were translated into English for the presentation of the research results of this study.

For a first analysis of the interview transcripts, an inductive strategy has been applied. Yin (2018) also describes this strategy as working the data from the “ground up” (p. 169). He states that instead of thinking about theoretical propositions one can “pour through” the data (Yin, 2018, p. 169). Further, Yin (2018) argues that insight deriving from this strategy can “become the start of an analytic path, leading you further into your data and possibly suggesting additional relationships” (Yin, 2018, p. 169). In fact, at this stage in the research process and data analysis, the theoretical framework with social constructivism and the final

research questions have been developed and further themes like *well-being* and *meeting place* have been detected.

After reading, re-reading and poring through the data, the interview transcripts have been coded with the help of NVivo, a data analysis programme for qualitative research. Each interview has been read and the content, relevant to the research questions, has been coded. Afterwards, the codes have been analysed and the ones that showed similarities have been collated into themes, either into the four already existing themes or new themes that emerged in that step of the data analysis. The dataset consisted of 83 codes (subthemes) and after collating the subthemes of seven main themes. In the following table examples of three of the seven themes and some of their codes are represented.

TABLE 2 EXAMPLES DATA ANALYSIS; THEMES AND CODES

Theme	Code	Example citation
Living learning environment	Possibilities	<i>This environment gives children so much, us pedagogues also, it is giving a lot for free in learning, exactly like I experience the whole nature. (Ped 3)</i>
	Life cycle	<i>One becomes conscious of the cycle in the world quite naturally, with animals and bugs and when do they appear and what do they need to grow. One sees that naturally in our verksamhet. [...] it exists here the whole time and that influences me, so I don't have to add that, but I take care of that when the children see it. (Ped6)</i>
	Cultivation	<i>And exactly to experience these processes of cultivation from that one is sowing inside to the greenhouse or outside, that one sees the whole course, that they carry it with them. (Ped11)</i>
Requirements	Curiosity	<i>One has a curiosity and attention to what happens. (Ped4)</i>
	Knowledge	<i>It needs knowledge around it. At the same time, we cannot know everything, and we are capable of various amounts, different personnel, but that there is a will to learn. (Ped10)</i>
	Responsiveness	<i>We must be responsive to it [the garden]. That is a similar way to how we work with the children to be responsive in what we must work with today or which feelings or which external factors do we have. (Ped11)</i>
Challenges	Children's needs	<i>Challenges, big challenges are the interests of the children versus the garden versus that together, how to combine that. (Ped5)</i>
	Order	<i>One needs to have a kind of order to get a visual feeling of resting, that it gets beautiful also if it is practical and also if we can play there, it should not look messy. (Ped8)</i>
	Work	<i>It can also be challenging in terms of work; it needs to be taken care of. One must rake and the garden needs to be restrained [...]. (Ped6)</i>

4.6 LIMITATIONS AND DELIMITATIONS

Yin (2018) describes the “inability to generalize from case studies” (p. 20) as a common concern. Similarly, Brinkmann and Kvale (2015) note difficulties in generalising findings from interviews and case studies. However, they argue that if “we are interested in generalizing [...] we may ask not whether interview findings can be generalized globally but whether the knowledge produced in a specific interview situation may be transferred to other relevant situations” (Brinkmann & Kvale, 2015, p. 296). Both, Yin (2018) and Brinkmann and Kvale (2015) acknowledge analytical generalisation, which involves using arguments that are based on theory. Moreover, Yin (2018) argues that in “doing case study research, your goal will be to expand and generalize theories” (p. 21). He notes that generalisations can be based on “corroborating, modifying, rejecting, or otherwise advancing theoretical concepts [...] or “new concepts that arose upon the completion of your case study” (Yin, 2018, p. 38). Accordingly, the findings of this study will be discussed regarding social constructivism as the theoretical concept to address analytical generalisation and external validity.

Another challenge in case study research is construct validity. Case study researchers have been criticized for failing “to develop a sufficiently operational set of measures and that “subjective” judgements [...] are used to collect data (Yin, 2018, p. 43). Yin (2018) states that using multiple sources of evidence and data triangulation strengthens construct validity. As already described earlier (research methods) evidence from observation, photographs, and interviews have been used for this case study research to address construct validity. Yet, evidence from observations was rare due to the alteration of the research process. However, methodological triangulation with interviews, photographs, research diary, and observations could be ensured.

Further, for organizational reasons, the interviews have been conducted on five different occasions with two months between the first and the last interview. Consequently, the pedagogues could talk about the interview contents in between. Therefore, the findings of interviews later in the process might be altered due to these circumstances. However, considering the characteristics of the open interview questions I assume that the alterations are limited. In fact, also answers in later interviews revealed individual insights into the pedagogues’ perceptions of garden-based learning.

Considering that the research has been conducted in a Swedish preschool, the issue of language must be considered as another limitation of the study. The Swedish language is my third language that I started to learn approximately three years before the start of the research process. Although I studied Swedish to the level of upper secondary school and I communicate fluently, I still consider myself in the process of learning and challenges can occur in everyday communication. Hence, it is probable that a native Swedish speaker would have communicated, understood contents, or asked questions differently since my abilities are limited. However, to make sure that the interview contents were correctly transcribed I listened to them several times and send them to the participants for member checking.

4.7 ETHICAL CONSIDERATIONS

Cohen et al. (2011) describe a major ethical dilemma, where researchers are required “to strike a balance between the demands placed on them as professional scientists in pursuit of truth, and their subjects’ rights and values potentially threatened by the research” (p. 75). The participants’ rights to freedom and self-determination can be respected by informed consent, which is viewed as “a cornerstone of ethical behaviour, as it respects the right of individuals to exert control over their lives and to take decisions for themselves” (Howe & Moses, 1999, as cited in Cohen et al., 2011). Consequently, only pedagogues who gave their written informed consent (appendix 3) were part of the research, observations, or interviews.

The participants were informed about the aim of the study, the process of data collection and documentation, and their right to withdraw their consent at any point in the research process. Further, the pedagogues were notified that neither they nor the preschool would be named in the research study. However, they were also informed that there might be a potential risk that the preschool could be identified through an investigation based on the characteristics of the preschool.

Accordingly, the observations have been documented through handwriting and anonymously to secure confidentiality. Also, the transcripts of the interviews have been written in word without any reference to the interviewees and saved on an external device. However, each interview transcript has been sent to each participant via E-Mail to administer member checking. The E-Mail addresses were personal and given together with informed consent. Sending the transcripts electronically has been approved by the interviewees and in that way, the data could be shared with the participants, hence transparency could be ensured.

The interviews were conducted in the preschool building or outside with a view of the garden or the preschool. Thus, the participants were in an environment that was familiar to them. I left the decision where to conduct the interviews to the participants with the aim that the pedagogues feel as comfortable as possible. Before starting the audio recording device, I notified the interviewees and waited for their confirmation. Similarly, I informed them when turning off the device. During one interview situation I felt unsure if the pedagogue felt comfortable. I asked afterwards if the situation, also regarding to the audio recording felt all right. It was confirmed by the pedagogue that it was fine.

In other situations, participants shared personal experiences, for instance from school experiences during their childhood or their own children’s experiences. These reflections probably affected the participants’ emotions. However, it was mentioned by several participants that the interview questions might also be interesting for group discussion and that the pedagogues might use the interview transcripts for internal discussion and reflection. Further, a pedagogue noted at the end of an interview the positive aspect of it. “No, I think things like that are fun, to get these kinds of questions done, that are things that I actually know, but to put it into words isn’t always that easy, so it is nice to do that sometimes”, the pedagogue said. Consequently, I consider the benefits from this study not only in consideration of the knowledge gained but also for the participants and preschool team to balancing out potential harm to the participants. Brinkmann & Kvale (2015) state accordingly that from “a utilitarian perspective, the sum of potential benefits to a participant and the importance of knowledge gained should outweigh the risk of harm to the participant” (p. 96).

Further, Brinkmann & Kvale (2015) note that the “role of the researcher as a person, of the researcher’s integrity, is critical to the quality of the scientific knowledge and the soundness of ethical decisions in qualitative inquiry” (pp. 96-97). Accordingly, open communication about my intention and interests but also consideration of the pedagogues’ interests and needs in decision making has been essential for my inquiry. Hence, transparency has been important in reporting as well as conducting the research study.

Moreover, my appearance as a researcher in the preschool probably altered the discussions between the pedagogues and the focus of the pedagogical work. It was mentioned in a personal talk by the pedagogue who is responsible for the garden, and in a general interview she stated “But, we have also changed the project order, so from this year we have the idea that, that we will stop with the usual projects a little bit earlier, so we go in in a green season where we all try to concentrate on the garden”. Thus, me entering the environment of inquiry altered the environment and perhaps also part of the research findings. However, I consider this alteration as an unavoidable part of a qualitative research inquiry, and in the case of this study also as ethically justifiable.

5. BACKGROUND INFORMATION

5.1 THE PRESCHOOL

To get more background information about the preschool, an interview with one of the founders, who still works at the preschool, has been conducted. The following description is based on the interview transcript and observations during visits to the preschool.

The preschool is situated in the Swedish countryside, close to the ocean and forest area. It has been started in 2003 by two pedagogues. One of them wished for a preschool that was more empathic towards every child’s need, something that she did not experience when her child attended childcare. She stated further that she thought that it “has to be better with a preschool that thinks a bit more Reggio Emilia like, that was actually the motivation”. Hence, the pedagogy of Reggio Emilia has been part of the preschool from the very beginning.

Further, both founders have been interested in cultivation. “We thought that the preschool should be a, a paradisiac place that would be lovely both for the personnel and the children”, the pedagogue stated. Very soon after the preschool started, the pedagogues acquired a greenhouse and started cultivating inside the greenhouse and in other parts of the school garden. Years later, in 2014, parents recognized that the pedagogues worked ‘permaculture like’. However, the pedagogues did not know until then what permaculture was. The parents that recognized their work held a lecture about permaculture and one of them planned a permaculture design for the garden. Together with the pedagogues, children, and parents the garden was reconstructed into a permaculture garden.

For the reconstruction materials have been re-used, for example, bricks from another building side and parents donated branches of berry bushes to the preschool. The recycling and re-using of different materials have been and still are part of the preschool culture. Examples that the pedagogue named were flowers that were dug out in another garden, candy boxes for

starting plant seeds, or alga and sheep wool for the garden. Further, prebuild toys are very rare in the preschool. Instead, natural, and other everyday materials are used for playing.

In 2020, 14 pedagogues worked with 5 age-homogeneous groups of children in the preschool. Around 70 children attended the preschool. Further, one cook prepared the meals for the children and personnel, that were served in the canteen which also functioned as the *inomhustorg* (communal area). The different groups were named after flowers, for example, *lavendel* (lavender) or *lejongap* (snapdragon). Each group could access the preschool garden through their exit from the preschool buildings. Amongst others, the garden was home to a variety of berry bushes, fruit trees, herbs, vegetables, a small pond, several chickens, and a rooster.

5.2 THE REGGIO EMILIA APPROACH

Reggio Emilia is the name of a city in northern Italy where a “municipal childcare and preschool program” (Otskey, 2010, p. 795) was initiated and still exists. After World War II a group of parents, educators, and children came together under the leadership of Loris Malaguzzi to create a “new kind of school for young children” (Edwards & Gandini, 2018, p. 365). “The first preschools opened in 1963, followed by the infant and toddler childcare programs in 1970” (Otskey, 2010, p. 795).

The Reggio Emilia approach describes a philosophy and pedagogy that “is founded on a distinctive, coherent, evolving set of assumptions and perspectives drawn from many disciplinary and scholarly traditions” (Edwards & Gandini, 2018, p. 368). The Reggio Emilia schools are inspired by the ideas of John Dewey and have their theoretical grounding in “the constructivist theory of Jean Piaget and the sociohistorical theory of Lev Vygotsky” (Edwards & Gandini, 2018, p. 369). Further, the Reggio Emilia approach shares “a philosophical hope in childhood as a source as societal renewal and regeneration, and an articulated political vision of education as a setting where children and adults may realize their full potential as intelligent, creative, whole persons” (Edwards & Gandini, 2018, p. 368) with the approaches of Maria Montessori and Waldorf (Rudolf Steiner). However, it was important for Loris Malaguzzi to be curious and open to learn from other fields like humanities or arts as well (Edwards & Gandini, 2018, p. 368). “It is important for pedagogy not to be the prisoner of too much certainty but instead to be aware of both the relativity of its powers and the difficulties of translating its ideals into practice”, Malaguzzi stated in an interview with Lella Gandini (Gandini, 2012, p. 37).

The positive image of the child, one of a confident and “capable participant in learning” (Dodd-Nufrio, 2011, p. 236) is a key principle of the Reggio Emilia approach. The child is seen as an active participant that possesses “extraordinary potential for learning and changing” (Edwards & Gandini, 2018, p. 370). Further, every child inherits “the desire to connect with others [...], and to enter into a relationship with their environment” according to the Reggio Emilia approach (Dodd-Nufrio, 2011, p. 236). However, the literature describes numerous principles of the Reggio Emilia approach (Edwards & Gandini, 2018; Edwards et al., 2012). In the following, I will focus on the ones that focus on the children’s learning and expression, the role of the teacher, the participation of families, and the role of the environment.

In Reggio Emilia, the child is seen as a constructor of knowledge that is “interacting in ways that are unique and subjective but always in relationship with peers, adults, and the environment” (Edwards & Gandini, 2018, p. 372). Hence, the learning process happens individually and in co-construction with others and the environment. The children’s “creativity, uncertainty, intuition, and curiosity” (Edwards & Gandini, 2018, p. 372) are central to and beneficial for the learning process. To express their feelings and thoughts, children use a hundred languages (Edwards & Gandini, 2018; Malaguzzi as cited by Gandini, 2012, p. 3). For instance, it is said that they express themselves and develop competencies in “using spoken language, gestures, drawing, painting, building, clay and wire sculpture, shadow play, collage, dramatic play, music, and emerging writing” (Edwards et al., 2012, p. 7). Thus, creativity, expression and aesthetics are given strong importance in the Reggio Emilia approach (Cooper, 2012, p. 297).



PHOTOGRAPH 2 PART OF A POEM BY LORIS MALAGUZZI IN THE PRESCHOOL GARDEN (MARCH 2020)

The atelier is a central element in a Reggio Emilia preschool. It is not simply seen as a place for creativity and making arts, but as “a rich and well-appointed research environment” (Cooper, 2012, p. 297) that endorses the pedagogues’, families’ and children’s understanding of learning. The atelierista, a pedagogue who is working in and with the atelier is seen as “a thoughtful, skilful researcher of children’s and adults’ way of knowing who, at the same time, remains a playful, nurturing companion in ongoing experiences” (Cooper, 2012, p. 297). Hence, the atelier is seen as a learning environment for both, the children, and the pedagogues. Consequently, also pedagogues are learners and researchers within the approach of Reggio Emilia.

The shared “research between adults and children is a priority every day, necessary for interpreting the complexity of the world and a powerful instrument for renewal in education” (Edwards & Gandini, 2018, p. 371). Essential for a shared investigation and inquiry as a source of the co-construction of knowledge is an “active attitude of respectful listening between adults and children” (Edwards & Gandini, 2018, p. 371). Listening is viewed as “an ongoing process that nurtures reflection, welcoming, and openness toward oneself and others” (Edwards & Gandini, 2018, p. 371). Also, in the process of investigating and listening, the pedagogues need to join the children’s curiosity and excitement and intend “to enter into a kind of intellectual dialogue with the group of children” (Edwards, 2012, p. 151).

Moreover, through listening and observing, the pedagogues can document children’s thoughts and interests, which helps them to reflect, and plan and design “activities for teaching and

learning” (Edwards & Gandini, 2018, p. 371). However, the documentations are not solely used by the pedagogues but shared with the children, families, or a wider audience (Edwards & Gandini, 2018, p. 371). Hence, documentation in that sense makes learning processes visible and starts new discussions between pedagogues, children, and families.

The Reggio Emilia approach sees education as a “communal activity and as sharing of culture through joint exploration between children and adults who together open topics to speculation and discussion” (Edwards et al., 2012, pp. 7-8). Consequently, also the parents or caretakers participate in educational processes and are viewed as the second teacher in the Reggio Emilia approach. Everyone is welcomed “to contribute ideas and share in the common purpose, with a plurality of viewpoints and cultures seen as a resource for constructing meaningful dialogue and sense of belonging.” (Edwards & Gandini, 2018, p. 371). Further, participation is considered to nurture inclusion, solidarity and responsibility and it “produces forward movement and expansion of connections in the contemporary globalized world” (Edwards & Gandini, 2018, p. 371).

In Reggio Emilia, the environment is considered to be the third teacher (Edwards, 2012). The spaces inside and outside are supposed to foster “interaction, autonomy, exploration, curiosity, communication, inquiry, and well-being” (Edwards & Gandini, 2018, p. 372). “The environment interacts with and takes shape in relation to the learning experiences of the children and adults, in a constant dialogue between architecture, and teaching and learning” (Edwards & Gandini, 2018, p. 372). Accordingly, in Reggio Emilia, the environment is not only part of learning processes but is an active participant that also changes with the processes of learning and reflection as mentioned above when the pedagogues design teaching activities. Further, the care of “objects, and activity spaces by the children and adults generates psychological well-being, a sense of familiarity and belonging, an appreciation for beauty and aesthetics, and conditions for a safe environment” (Edwards & Gandini, 2018, p. 372).

In conclusion, in Reggio Emilia, the child is seen as a competent, creative, and active learner while the pedagogue takes the role of a co-constructor of knowledge and supervises documentation as part of transparent, reflective, and open-ended learning processes. Knowledge is constructed between children, adults, and the environment. Consequently, how a preschool, its pedagogy and the environment is explicitly designed within the Reggio Emilia context depends on the children, pedagogues, parents, and the environment itself.

5.3 PERMACULTURE

Since permaculture has been described as a part of the preschool it will be explained briefly, and its main principles will be presented in the following.

The Dictionary of Environment and Conservation defines permaculture as a “permanent agriculture: a sustainable form of agriculture that is designed to enhance local ecosystems and increase local biodiversity, for example by providing fuel, materials for shelter and home, and habitat for livestock, as well as food” (Park & Allaby, 2017, p. 335). Similarly, David Holmgren, one of the founders of permaculture describes permaculture landscapes as “consciously designed landscapes which mimic the patterns and relationships found in nature,

while yielding an abundance of food, fibre and energy for provision of local needs” (Holmgren, 2002, p. xix). According to these descriptions, permaculture can be defined as agriculture where one is using patterns of nature to design a landscape that is retaining and improving biodiversity while simultaneously providing for local needs.


In the middle of the 1970’s, Bill Mollison and David Holmgren coined the term permaculture (Phillips, 2011, p. 349). It was developed as agriculture that was more permanent and sustainable than western industrial agriculture and an answer to the environmental crisis (Mollison, 1988, p. 1). The prime directive of permaculture, described by Bill Mollison, is: “The only ethical decision is to take responsibility for our own existence and that of our children” (Mollison, 1988, p. 1). Further, Mollison describes cooperation as another permaculture principle: “Cooperation, not competition is the very basis of existing life systems and of future survival” (Mollison, 1988, p. 2). Hence, permaculture is about the interrelation of different elements of a cooperating system, “a way of thinking about, creating, and supporting interrelationships of various elements (house, garden, chicken, etc.) to form sustainable human settlements” (Phillips, 2011, p. 350).


David Holmgren states that “people, their buildings and the ways they organise themselves are central to permaculture” (Holmgren, 2002, p. xix). Consequently, permaculture is not solely permanent agriculture but has "evolved to one of permanent (sustainable) culture" (Holmgren, 2002, p. xix). From focusing on land and nature, permaculture design and ethical principles are now being applied to other areas like finances, management, technologies, or well-being (Holmgren, 2002, p. xx; Macnamara, 2012).


Permaculture design principles have been explicitly described by Holmgren (2002). At this point, it seems important to provide a brief overview of the design principles to give the reader a better understanding.


Permaculture Design Principles


- 1 Observe and Interact**
Beauty is in the eye of the beholder



- 2 Catch and Store Energy**
Make hay while the sun shines



- 3 Obtain a Yield**
You can't work on an empty stomach



- 4 Apply Self-regulation and Accept Feedback**
The sins of the fathers are visited on the children unto the seventh generation



- 5 Use and Value Renewable Resources and Services**
Let nature take it's course



- 6 Produce No Waste**
*A stitch in time saves nine
Waste not, want not*



- 7 Design from Patterns to Details**
Can't see the wood for the trees


- 8 Integrate Rather than Segregate**
Many hands make light work


- 9 Use Small and Slow Solutions**
*The bigger they are, the harder they fall
Slow and steady wins the race*


- 10 Use and Value Diversity**
Don't put all your eggs in one basket


- 11 Use Edges and Value the Marginal**
Don't think you are on the right track just because it is a well-beaten path


- 12 Creatively Use and Respond to Change**
Vision is not seeing things as they are but as they will be




Figure 2 Permaculture design principles by Holmgren (2002, p. viii)

The underlying ethical principles that the design principles derived from are earth care, people care and setting limits and fair share (Mollison, 1988; Holmgren, 2002). Concludingly, permaculture is a way of designing sustainable landscapes while applying the above-mentioned design and ethical principles to create a sustainable way of living. In a wider context, permaculture can also be applied to other areas and promote for instance technical or social sustainability.

6. PRESENTATION OF THE RESEARCH RESULTS

In the following chapter, the results of the research study in consideration of the four research questions will be presented. Firstly, the characteristics of the garden such as the garden as a meeting place, a changeable environment, a place of well-being, and a living-learning environment will be explored. Secondly, the results concerning the requirements of garden-based learning will be unveiled. Further, the relation between teaching, learning, and the garden will be examined and finally, challenges of garden-based learning will be presented. The following figure visualizes the seven different components emerging from the analysis of the research data.

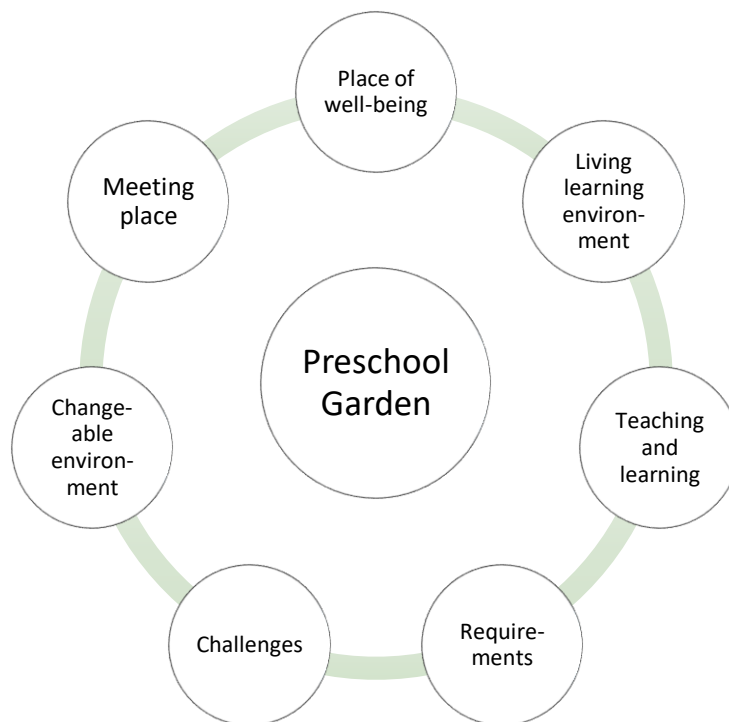


FIGURE 3 OVERVIEW RESEARCH RESULTS

The research results will be presented through condensations of subthemes that emerged within the data analysis and largely through citations, the teachers' voices. It was a conscious decision to include a thick description (Geertz, 1973) through the voices of the teachers. The utilised citations have been chosen carefully regarding their means to exemplify the research findings shown in figure 3.

6.1 THE GARDEN AS A MEETING PLACE

The pedagogues described the garden as an important part of the preschool *verksamhet* (activities of the preschool) and as a meeting place in two different manners, as a physical meeting place and a place that creates togetherness and represents a shared philosophy. Further, the garden is also referred to as "our place", the pedagogues', children's, and even the parents'.

The following citations of the preschool pedagogues represent examples of the garden symbolizing togetherness and a shared philosophy:

It [the garden] is a nave here, it is a picture of what we want with our verksamhet, I think. (Ped3)

It means that one, one has a common project also the whole house, that one has something one takes care of. That one has a common philosophy around it. And I really think we have that. So that is gorgeous. [...] And that means a lot for us who work here that we have like similar thoughts. (Ped6)

It [the garden] is, our garden is good in many ways. It is like, I have worked in so many different preschools but here yes it [the garden] lives in a totally different way than usual preschool gardens. It is the children's and adults' together in a totally, in a totally powerful way, it is magical. [...] So, it creates a link the whole time, a link like between everybody. (Ped8)

And that we have, this is our place. I think it is amazing to feel like that. (Ped11)

The examples above demonstrate not only that the preschool garden creates a togetherness between the pedagogues, but also their positive feelings about it when stating “that is gorgeous”, “it is magical”, or “it is amazing to feel like that”. Further, beyond being a place for shared thoughts and philosophy, the garden is also perceived as a physical meeting place. A place where one is socializing and communicating with each other, adults and children. This is how two of the pedagogues described it:

A place where one can socialize and be with each other, I think. (Ped7)

Also, a room where one is meeting and talking, both adults-children, children-children and adults-adults, this is how it is. One is meeting across the hemvisterna [residences of the different preschool groups]. (Ped8)

Hence, the garden becomes a physical meeting place for the children and pedagogues outside of the preschool buildings and a place that creates and symbolizes a shared philosophy. However, the garden is also perceived as a meeting place for parents. In fact, one teacher described the garden also as a place through which parents feel participation.

And we have, they [the parents] have also been invited to be, they could come with plants and share things from home that we needed. And then they also get privy to, to feel that it is theirs also. [...] But exactly that, I believe that they [the parents] feel participation, I hope that they do. (Ped11)

The same pedagogue states further, that the parents are also involved through working days in the preschool.

We also have had working days to like to help each other and fix things and so on. That is also a feeling that this here is ours. (Ped11)

The value and benefit of working days in the garden with parents were mentioned by other pedagogues as well. These days are seen as beneficial for both the parents and the children. The following citations describe this finding more extensively:

We work quite a lot with the network parents in between and how one can make the most of what exists and their knowledge. We also have worked a lot with working days where the parents can come and help and fix certain things. And I believe it is beneficial for both the children and also the parents that one can feel that yes, I could do something that the children can play with now. And maybe the children that one, yes this here, this flowerbed my father actually built and then it gets more valuable. (Ped2)

They [the parents] think it [the garden] is good and one recognizes that in that way that, sometimes we have working days and they think it is fun to come here and to be part of and fix and participate in what exists. And that, that is not always easy in a preschool to get the parents to participate. So that is a benefit and I believe that it has both with our whole vision to do but the garden is a big part of that.

So, it has to do with both, the personnel, and the garden. (Ped8)

Another pedagogue used the description of *community days* and highlighted the meaning of finding social cohesion through work in the garden. The pedagogue stated:

We have tried to arrange community days where the parents can meet each other and where we can build things, do things, do garden work that needs to be done together. And that work feels very meaningful for the children and parents to find social cohesion. [...] They can also say that the preschool needs a bit of help and work, so we cumulate us to tussle a bit. But this is not the purpose alone, of course, this purpose to get things done in the garden also exists, but the garden is a really good place cumulate around and work. (Ped5)

Thus, the garden becomes a place to involve parents, where parents feel that they can participate and become a part of the preschool. Further, it becomes a place for community and social cohesion, where parents can meet each other.

Consequently, according to the pedagogues does the garden as a meeting place connect pedagogues, children, and parents in a physical and social way. It becomes a place for togetherness and communication, that creates a link between the ones working in and with it and is ground to a shared philosophy.

6.2 THE GARDEN AS A CHANGEABLE ENVIRONMENT

Afterwards [after the interviews] I went shortly through the garden to take a picture from the outside.

When opening the garden gate, I realised how hard it was since plants had grown around. When I went out the garden gate, I realised that I had to change my standing point, perspective to be able to take a picture of the garden. It had grown so much and looked completely different.

(Field note, 8th of June 2020)



PHOTOGRAPH 4 PRESCHOOL GARDEN IN MARCH 2020



PHOTOGRAPH 3 PRESCHOOL GARDEN IN JUNE 2020

My observation of change in the preschool garden corresponds with the pedagogues' perceptions. The pedagogues described different changing elements of the garden during the interviews. One of these elements that change the environment of the garden is the seasons where the vegetation changes. For example, two pedagogues stated:

It is a room that is so changeable [...] I think it is valuable to have a garden and to see the changes, changes in a year from such a close perspective where one can be part of that together with the children. (Ped10)

It is of course a difference on a spring day, summer day, autumn- or winter day, and a rainy day, a cloudy day, a wet day. (Ped5)

Further, especially the change in the garden during and after the summer vacation is emphasised by several pedagogues. For instance, they said:

Because we can come back after the summer, then it is like ohhh now everything has, I mean it is like a jungle. It is very interesting then, one does not see the children. And then the difference to winter, then there is nothing at all, no plants that do that one does not see each other. (Ped11)

One comes here in the turn of July-August or some come in the middle of August at the End. Then it is gorgeous, I mean to have these big sunflowers that stand like brrr [sound], just explode one has not seen and marigold. I mean there is so much that happens in June, July, August in the garden when we maybe are not there so often but it also creates the effect that one sees the difference when one comes back. It will be even more green, there will be even more places where one can crawl in and hide. (Ped3)

The experience of these changes is valued by the pedagogues as beneficial for the pedagogical work and the children. Two of the pedagogues summarized it like this:

And I think it also means something to see the changes, that children can experience in their bodies already when they are small. To like see the rhythm in, in the seasons. It is really obvious here. It means everything. It is what we start from. (Ped3)

It is also if we, we know that it is like circular, I mean it comes back and that we can, it is also something we can work with pedagogically. [...] One sees these conversions and changes, to like espy, I can think that one learns something every time it is spring. [...] So, I believe because nature is so variable it gets pedagogically interesting and easy to flow with it, I mean. It is such an enormous richness to have the garden. (Ped11)

Hence, these changes during the different seasons that repeat themselves are experienced by the children and are strongly connected to their learning and the pedagogical work in the preschool. For instance, the conversions and rhythm of the garden lead to communication about those experiences:

And now we will start to plant soon, and one just waits that the earth is warm enough and the children explore that it is growing again and remember what has been growing last year and start to talk about what happens. (Ped8)

Well, it [the garden] influences so that children can see things that happen, that there are things to talk about, and that one comes back to the same place does that one can also see the changes. (Ped11)

Moreover, several pedagogues emphasised the possibility for the children to taste fruits like berries in the garden. One pedagogue explained the learning process of experiencing this effect of seasonal change more explicitly:

We think that there is nothing better than a living garden where one sees the changes in seasons and how it like ends and to know here will be raspberries if one just waits. And then there are some that eat the green ones because they cannot manage to wait. But then if one waits one sees that they get a bit better and to see this cautiousness growing in the children. The older the children get the less they eat green berries because they know it is worth waiting and that it will come. (Ped1)

The seasonal change in the garden also leads to different possibilities for the children to move since plants are getting bigger. However, also the children create change in the garden with their ways of moving in it. For instance, one pedagogue described the influences as follows:

But we can also guess at some places where they don't go so often and there we cannot steer them. Maybe it is the plants that also do that they don't go this way. So, it is obvious that we influence and the garden influences. I mean it is everybody that in a way puts its stamp on it [the garden]. (Ped11)

Hence, the garden changes seasonally and by the influence of the people moving and working in it. The following two citations exemplify the latter influence:

We made small staircases down at different places but there, for example, they ran down at other places so maybe it became more ways down than we thought. (Ped2)

In winter we always think, how will it recover because it is very worn from all the children in it, all the slopes all the greens disappear. (Ped10)

Further, the changes in the preschool garden lead to a situation where there is always something to do in the garden. The pedagogues describe that there is always something new and always something to fix, which is portrayed as both positive but also difficult. For instance, one pedagogue explained that it becomes more variable and different every day to go out into the garden:

That there is something to examine, that there is something to continue with, that it doesn't only get: now we go out how we did yesterday, how we will do tomorrow and how we will do in a year, but what can we find here today. (Ped2)

Another pedagogue described the growing plants and the necessary garden work as something “nice” because it never gets boring:

I do not experience that it is boring to be outside here because there is always something new. Because we go like from seed to plant, one must thin out, one must harvest. I mean there is always something new happening, we are always in a circle or how to say. So, it never gets boring. That is nice. (Ped6)

In contrast, another pedagogue stated that one can get tired because some things need to be fixed very often. However, in that case, the change is caused by many children in the garden. The pedagogue explained:

We struggle constantly as personnel with the children that we actually are so many in a small space. It gets worn, one is fixing something and then one is totally irritated two years later that it is broken because one wants that it continues to stay like that. So, it is wear and tear to have a preschool at such a place or such a garden. One can get a bit tired sometimes. (Ped8)

A further pedagogue described both perspectives, that is “nice to renew” but also that it can be nice to think to just be done at some point. Beyond, the pedagogue also draws a connection to creativity one gets by renewing and improving:

But it also means that it is a continuous development that one can always fix something with it [the garden]. It is nice to try to renew, improve and it is most often also satisfying to have that possibility because it feels like getting some creativity with it. Even if one can think sometimes how nice to just be done at some point but it will never be. And life is also never done. It is not done one day or it can.
(Ped4)

Consequently, the preschool garden as a permaculture garden becomes a changeable and variable environment. Its vegetation changes throughout the year which leads to different experiences and influences the pedagogical and physical work in the preschool.

6.3 THE GARDEN AS A PLACE OF WELL-BEING

All the pedagogues viewed the garden as very important and meaningful when they were asked what the garden means for them. However, several pedagogues also described further positive feelings about the garden. According to them, the garden becomes a place of well-being, a place to calm and to rest in. In the following some examples are presented to explicate these findings:

I mean it means well-being, that one feels good about seeing the garden and being in it and also to know that the children have access to it, that is wonderful. It is such a feeling of well-being, that one feels good because of that. (Ped1)

I think it is wonderful. I fell in love with the garden when I came here the first time. (Ped9)

I believe that it [the garden] means happiness and happiness and happiness. [...] It does a lot, that it is meaningful and fun and exciting that this place does not stay the same, that it changes the whole time. And I believe that it contributes to making that what is my working place to a rich and exciting environment that I don't get tired of. (Ped4)

Consequently, the garden with the characteristic of a changing environment contributes to the well-being of the pedagogues. Further, besides being an environment where the pedagogues like to be and can relax, the children like to be in the garden as well. For instance, a pedagogue stated the following:

We adults relax a lot when we get out. [...] I mean, I feel a bit better, or I feel a lot better because of it [the garden]. It is fantastic, a time where one just enjoys being outside, to just have these resting-moments that exist in the work one does or in the rest that the children just love to be outside, where one just goes and listens to them, watches them. So that is extremely calming. (Ped5)

Thus, the garden is a place that affects the pedagogue' and children's well-being. More explicitly, the garden is perceived as calming because the children can move freely:

It [the garden] is a calm environment even if the children are not calm and are running around, so can we adults be calm in it anyway. The children can move freely without that I have to fear that they run out to a road or fall on asphalt. (Ped3)

Correspondingly, other pedagogues connect the well-being of the children to freedom as well. The garden becomes a place of freedom and liberation, where the children like to be. The following citations strengthen and exemplify the finding:

The, the first spontaneous thought is that it is a room for freedom and play and where one just flows as a child. (Ped8)

Most of all, I think it [the garden] is, is a liberating environment, I think. That the children just like ohh and that it is a positive place for the children to feel, that they feel free and sometimes we adults want to fall into that in a way. (Ped3)

They [the children] are longing to go out and they feel a kind of freedom when they come out. So, it is a joy to come out and it is never, it is never like hard to get out children here. So that is, so the outside gets very pleasurable and, and then it is a lot, I mean, they have their own life in the garden, that they are longing for. (Ped4)

Hence, according to the pedagogues do the children enjoy going outside and feel free when they are in the garden. Further, the garden is also described as a calm environment because it reduces conflicts. One pedagogue portrayed it in the following way:

It is often conflict-free, the garden, which is calming, I believe, for everybody. That is why one is often seeking towards it. [...] Sometimes, we pedagogues can say no but yes, either that one has a lack in personnel or a lot of children or children with the need to move inside or no we got out, we go out and when one goes out into the garden and all these things just dissolve, less, less conflicts. (Ped5)

Another pedagogue perceived that a reason for reduced conflicts is that the children can take distance from each other and be on their own if they need to. The pedagogue stated:

It can get a bit, one is hunting and running, and one does not want to, and then the one can hide a bit, then the conflict does not get as big because I can have my own little corner where I can sit for a while and I can join again later as when the others urge it, it collides so much. So, I feel that it gets easier to be a bit alone when it is necessary. And I believe that it leads to that it gets calmer for many children. (Ped6)

Thus, the structure with places to hide in the garden creates a calm environment for the children since it reduces conflicts. However, the structure and vegetation in the garden lead also to a reduction of noise, which is perceived as calming by the same pedagogue:

I experience that it also gets calm because, maybe that sounds weird now, but it reduces the noise when it gets so green and thickly foliated and nicely. I mean one is sitting in its own, one can crawl into a little bush, one gets a bit shielded from each other sound and play-wise. So, one can also make small rooms in a room. [...] This here is like in a way it gets wonderful, it gets like calm. (Ped6)

Consequently, the preschool garden becomes a place of well-being for both the children and the pedagogues. The change of the garden, the vegetation and foliage seem to be essential for the garden to become a place that reduces noise and conflicts. It becomes a calming environment for children, and especially for the pedagogues.

6.4 THE GARDEN AS A LIVING-LEARNING ENVIRONMENT

The garden is described as a living environment that offers different learning possibilities. It is portrayed as a place for exploration, discovery, and play where children experience nature and the life cycle. Further, several pedagogues defined the garden as a classroom and the third pedagogue. Moreover, it is described as a pantry that offers natural materials that are used for the pedagogical work. In the following, I will clarify these findings with exemplary citations.

Some pedagogues described the garden as an additional classroom. However, others explained that it should be used more as a classroom, which will be clarified in the later chapter *challenges*. However, the garden is described as a free classroom rather than a traditional classroom, that is there to be explored and to work with natural materials:

It is like an additional classroom or an additional learning environment. (Ped2)

They learn a lot without sitting in a classroom. I mean it becomes a classroom and it, we are so much with natural materials and work with it. (Ped1)

Pedagogues who viewed the garden as a third pedagogue explained that the garden speaks to the children and teases out play and learning. For instance:

Here the environment makes up, here the environment teases out play and learning. In another more barren environment, I must work a lot more with my own person. That I have here as well but here it is another rest in that, it helps how we see in the Reggio Emilia Philosophy that the environment is the third pedagogue. It really becomes that here with the garden. A huge image of a third pedagogue. (Ped3)

We use it [the garden] as a yes, an assistance, another pedagogue is the garden in a way because it speaks to the children the whole time. (Ped5)

Moreover, the garden is also described as a “tool” that is used for learning. For instance, a pedagogue stated:

It becomes clear that the garden also becomes a tool or an instrument for us pedagogues to use when one wants to learn something. (Ped11)

Similarly, another pedagogue strengthened the following:

It is a lot easier to show everything one is talking about than to just talk about it hypothetically. One can actually go out and look at different things. (Ped7)

Correspondingly, some pedagogues explained that the garden can be a learning environment through connecting projects to it, taking them outside. For instance:

Or that it can be like another inspiring learning environment where one can take that what we think about at the moment, so we go out and continue to examine [...]. (Ped2)

Before the garden has been like a playground for them actually, before we started with our project outside. (Ped9)

Further, the pedagogues acknowledged the garden as a place that inherits a lot of learning possibilities. For instance:

They get diversity in experiences also, I believe. (Ped6)

So, it is a big advantage anyway that one can see different animals and plants. We can plant like anything here. Yes, it is obvious that they learn a lot from that and to plant potatoes and all vegetables, one learns a lot from that. (Ped7)

More explicitly, several pedagogues emphasised that children learn to take care of nature, to be empathic towards nature. For instance:

And that one takes care of insects. [...] we are so close to nature, we live in nature in a way. But I think they [the children] get such a good ground with how to behave towards a garden and nature, to both that what is growing and living in it in a way. [...] It is probably that to be able to follow, I mean to feel a place and [...] they pick up so much. I mean it is so much social and empathic caring and to be able to take care about and to influence. (Ped11)

I believe it gives the children more empathic feeling for nature. [...] And I believe that children get that, through being in such an environment to be able to get closer to nature and growth. (Ped2)

And they get also more, more caring for the world when they see that here the whole time, I experience. (Ped6)

Thus, according to the pedagogues, children develop empathic caring and feeling for nature through being close to it and experiencing change and growth. Beyond, the pedagogue above (Ped11) emphasised the aspect of influencing, which was also stressed by other pedagogues:

But I think it is nice to have an own space where one can participate, where one can take initiative and where we can explore as a complement to the forest. Because here we can work with, to see what happens if one decides to plant and sow seeds and so on. I have thought about that from the beginning that it is nice to have both the closeness to the forest where everything grows more freely but also to have a space where one can actually influence the vegetation, I believe that is good. (Ped4)

It is the children themselves who have seen this here and then I say: think, here we have an environment that blooms and then it goes into a sleep or death to living up again, it is a creation. This here is a creation and that the children themselves through sowing seeds and anything can create actually and see a change that will be with them in their bodies. (Ped3)

Consequently, the experience of cultivation and the children experiencing their own influence is viewed as important for the children's learning. Further, it is stressed that the children learn about life and its cycle through experiences in the garden:

One becomes conscious of the cycle in the world quite naturally, with animals and bugs and when do they appear and what do they need to grow. One sees that naturally in our verksamhet [activities of the preschool]. [...] it exists here the whole time and that influences me, so I don't have to add that, but I take care of that when the children see it. (Ped6)

We keep on trying to understand the terms of life, what does it require to live and what happens, what is left when it died. [...] One can learn about life in a way, so one cannot get away with something cute here, but it gets close to reality to live in a garden where we also have animals. (Ped11)

Moreover, the experience of cultivation in the permaculture garden is stressed as important for learning but also for supporting empathy towards nature by several pedagogues:

And exactly to experience, these processes of cultivation from that one is sowing inside to the greenhouse or outside, that one sees the whole course, that they carry it with them. (Ped11)

Then I believe also that they get more understanding for how it works with everything. I mean how the tomatoes in the shop are cultivated or how it works and that we have chickens that one gets eggs from chickens. That it gets, one gets closer to the roots in a way. So, I believe that is giving in a way. But maybe it is most of all for empathy for our world and everybody's place in the system in a way. (Ped2)

Similarly, cultivation and taking care of animals is described as beneficial for learning about sustainability:

And it is also obvious that we do this because we work with sustainability and it is easy to take in the garden, especially the cultivation. (Ped11)

The advantage is also that one learns in a very easy way about sustainability and the future and to cultivate and take care of nature. Because it becomes so evident, do we destroy for the chickens then they will die. (Ped8)

However, the pedagogues described further aspects that children learn about in and with the garden. For instance, it is mentioned that the children can learn about the plants, their names, reading, and writing. Further, according to a pedagogue the children can learn about math while planting or harvesting when the plants and fruits are counted or weighed, for instance. Thus, natural materials in the garden become part of the learning process. Moreover, natural materials are used for play, building, creation and are taken inside. It is also mentioned that natural materials are used instead of prefabricated toys. For instance, a pedagogue stated:

We don't have so many toys. We have an idea that we maybe take in natural materials instead if one cuts off a lot of small stumps that one can use as building material. [...] I believe that the children use these things the whole time when they are outside. There is probably nothing as exciting as sticks. (Ped2)

Similarly, another pedagogue emphasised the diverse possibilities that natural materials inherit:

But I think natural materials are wonderful in the way that they can get so much, it is so free for fantasy for the children and the children use it in many different contexts. And one can use them to explore other things or use them in creative processes, natural material. [...] one can use it in creation or language or in many different contexts as well. [...] one can write with chestnuts instead of pens for example if one is laying them instead. (Ped10)

Moreover, several pedagogues stressed that it is beneficial if several natural materials can be used. For instance, a pedagogue explained the use of a certain number of materials inside and highlighted the possibility of giving the natural material back to nature:

It becomes an amount of material maybe that we can use as sorting material or that one can have a lot of. And to count or lay lines and things like that. We have also worked with leaves with the youngest, then we took it inside. And then it changes, I mean it dries and they crumble it. I mean actually, I think that if one gets tired of it so it gets thrown out, but actually one could think about... there one can see the whole process actually and how we can give it back to, give it back to nature. (Ped2)

Hence, natural materials are taken in to explore, work, and play with it. Moreover, the accessibility of natural materials through the garden is emphasised by several pedagogues. In fact, a pedagogue described the garden as a “pantry”:

I mean I think that a lot of these projects we do, that one can go out and collect inspirations and we do that a lot. I do that a lot that I collect vegetation [...] So it is like one takes that from the garden before going into the atelier, so one starts with what exists. So, it is a kind of a pantry. (Ped4)

Similarly, another pedagogue strengthened the accessibility and closeness to natural materials:

It is easy to go out and pick a sunflower and paint it. It is nothing that needs to be planned weeks before that I must go to the forest and collect acorn or what it can be. So, it is really close, and one can be more spontaneous with that. [...] It gets very, it is close, one can think to have the garden as a collaboration partner that is really close all the time. (Ped6)

However, which natural materials are accessible and how one can work with them depends on the seasons. Hence, the possibilities vary. For instance, a pedagogue stated:

One can use it, how one works is formed by the seasons. So, if it is in the middle of winter, it is most often twigs and stones, but in summer one picks flowers and creates works of art of clay, or not only inside but with pleasure outside if possible. (Ped8)

Finally, according to the pedagogues, the garden becomes a living-learning environment that inherits various learning possibilities. Especially the experiences of sowing from seeds, seeing the growth and change, taking care of the garden environment and animals, and experiencing the life cycle seem to be beneficial for the children's learning. In the following, I will present the pedagogues' perspectives on requirements for garden-based learning and later their perspective on teaching and learning in relation to natural materials and the garden.

6.5 REQUIREMENTS OF GARDEN-BASED LEARNING

In the following, I will focus on what according to the pedagogues, garden-based learning requires. The pedagogues mainly mentioned curiosity, interest, knowledge, or a will to learn as requirements for working pedagogically in and with the garden. Further, several pedagogues stated that it is important to dare to try and to be responsive to the garden.

For instance, several pedagogues stated explicitly that it is required to be curious:

It needs a base from the pedagogues that they are curious and like to be in a garden. (Ped8)

I think that one must be curious repeatedly. (Ped11)

Also, another pedagogue mentioned the importance of curiosity and creativity and explained it with the example of reusing materials:

I think it also requires a kind of curiosity from us adults, curiosity and creativity. How can we use what exists close to us instead? I thought the other day there was a group that poured some water and played with bark-boats instead of ordering plastic boats one can play with. One is able to think about if we can make our owns. (Ped2)

However, the same pedagogue also declared that knowledge is important:

It needs knowledge I experience and maybe also interest. (Ped2)

Several pedagogues asserted that curiosity or interest are most important for the pedagogical work in and with the garden and that knowledge arises from curiosity and interest. Some pedagogues stated:

We need more knowledge. [...] And more interest most of all. If the interest comes everything else also comes. (Ped5)

So, it needs a kind of knowledge from me as a pedagogue but also a curiosity and a will to work with the garden, because I think that curiosity does that I find out what I need to understand. (Ped6)

It needs an attitude from the pedagogues to tackle their own cognitive approach and acquisition, and to be quite active and to keep up. (Ped4)

The latter mentioned attitude, to take care of one's own learning processes, is described by another pedagogue as well. For instance, one pedagogue declared explicitly her will and need to learn:

More knowledge from my side. I keep learning continuously, so most often I stand beside and watch and then I get: now you can do it, okay then I do it. [...] Yes, I want to learn, I take in as much as I can when I see the others. (Ped9)

Another pedagogue described a specific learning process around permaculture-gardening:

It needs certain knowledge about permaculture, I mean like what is the thought with the garden and why is it build how it is. It needs certain knowledge from me as a pedagogue around that. I thought in the beginning that it was a bit weird that they never took away anything. I mean, that one is weeding but then letting it lay there to mulch and become soil. For me, it was more natural to take away the weeds and to throw it somewhere else, I mean to get rid of it. So that was a learning process for me how one can think instead, and how one can do it in another way. (Ped6)

In addition, the differences between the personnel's knowledge and abilities are acknowledged by several pedagogues. For instance, two of them stated:

It needs knowledge around it. At the same time, we cannot know everything, and we are capable of various amounts, different personnel, but that there is a will to learn. (Ped10)

Not everybody is able to do the same in the garden. It is good to have someone who is good with that, but everybody must be a bit curious and dare to try. (Ped8)

Thus, besides curiosity and a will to learn it is also important to dare to try and test and learn in that way. The following two expressions exemplify this finding more explicitly:

One should not be afraid to test. One must have the permission to fail in order to dare, I believe. [...] I believe we do not all feel equally secure in seizing things in the garden. And one wants that one dares and not that there is right or wrong in a way, but everybody can learn. I mean we want that the children explore, test, try. That we also must do as adults in a way. (Ped10)

It needs that the pedagogues feel comfortable and that they dare to do, to dare to try and that it doesn't matter if it doesn't turn out how they have thought. (Ped 4)

Hence, to be able to try and test, the pedagogues must feel comfortable and secure. The latter pedagogue (Ped4) explained that talk and reflection about the possibilities to try and to test are essential to feeling more secure:

It needs a certain talk and reflection around that we have this possibility, and many might feel a bit insecure in the beginning but then when they understand that it is just about testing forward, then many pedagogues become happy and feel that it is wonderful. (Ped4)

Further, several pedagogues explained that the pedagogical work with the garden requires to be aware of and responsive towards the garden to enable learning processes. For instance, two pedagogues clarified:

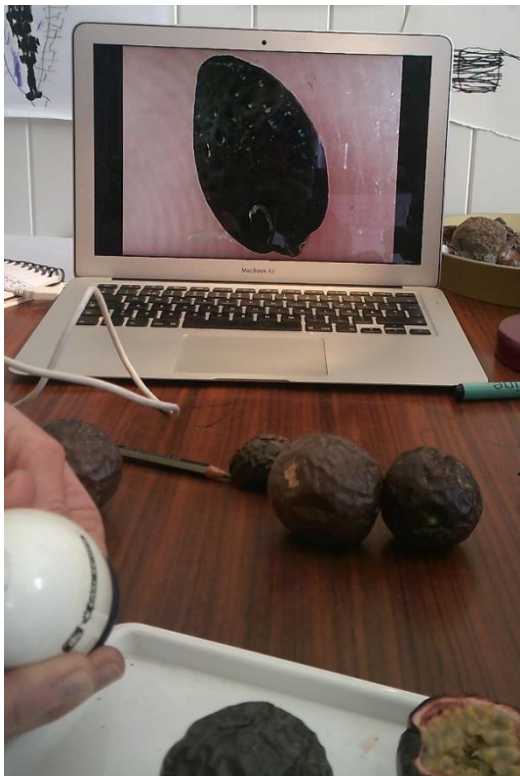
We must be responsive to it [the garden]. That is a similar way to how we work with the children to be responsive in what we must work with today or which feelings or which external factors do we have. (Ped11)

It requires that we adults have an eye for what nature can give in a learning context. (Ped3)

Consequently, according to the pedagogues does garden-based learning require curiosity, a will to try and learn, knowledge, and certain responsiveness. However, although knowledge seems to arise through curiosity and a will to learn, it also needs someone with knowledge since the learning does not solely happen through testing but also between the pedagogues as the examples above reveal. Correspondingly, a pedagogue stated:

It needs personnel that has knowledge about how to let it grow all year round [...]. (Ped3)

6.6 THE RELATION BETWEEN TEACHING, LEARNING, AND THE GARDEN



PHOTOGRAPH 5 EXPLORATION OF THE FÖREMÅL (OBJECT) (MARCH 2020)

I watched a pedagogue exploring an object that was called föremål, a round object that was brown and had the size of a golf ball, together with some children. It was an exploration with all senses, feeling, smelling, hearing, looking at it with the eyes and with a camera that worked as a microscope and was connected to a laptop. Simultaneously, the pedagogue asked questions like “How does it feel? How does it smell? What is inside? Do you want to open it?” The pedagogue also took notes about what the children said.

The pedagogue opened the föremål with a knife and continued to use the camera to explore the inside. After a while, seeds came into focus and the pedagogue tried to get a zoomed picture of one single very small seed.

When it was possible to see it on the screen and it showed a perfect evenly structure, the pedagogue turned to me with astonishment and said, “one is learning so many things”. The exploration ended after the pedagogue and children tasted the inside of the föremål.

(Field note, 11th of March 2020)

The documented observation above exemplifies different characteristics of teaching and learning in the preschool that were also discovered through the interviews. These characteristics are learning with all senses, acknowledgement of the competent child, emphasis on children's thoughts and interests, learning as an exploration between pedagogues and children and a life-long process. In the following, I will review these characteristics more deeply.

Similarly, to the observation above, several pedagogues stated that the garden and natural materials offer the possibility for the children to explore and learn through various senses. For instance:

It [the garden] gives a lot of sensual impressions they [the children] get from one year. [...] There you get sensual impressions, bodily, physical possibilities than if there would be asphalt, gravel.
(Ped3)

In the beginning, it is a lot of sounds and rattle and to feel. (Ped8)

More explicitly, learning becomes an exploration through feeling, smelling, and especially tasting. A pedagogue described more precisely how senses are used:

When the children that I work with now were a year we had a lot of leaves in autumn that we took in and they could lay in a pile of leaves to explore, feel, pinch, taste, smell. (Ped9)

Then when the berries are coming and so on, then they can taste, smell, it is a lot of tasting in many groups. (Ped9)

Further, the child with its competence and knowledge is recognized. For instance, a pedagogue viewed the thought of the competent child as important and as part of the work in the preschool:

I think it is so wonderfully thought, the competent child. [...] They grow so much through just doing on their own and feel that they, that they manage, that it is that feeling inside the child so that one feels that one manages, that that is very important, and that feels really nice because it is very much like that here. (Ped1)

Moreover, another pedagogue recognized the importance of emphasising the knowledge that children inherit and their ability to access that knowledge:

I think children show so much that they have knowledge, a kind of intrinsic human knowledge about vegetation and life in general. I mean this is a garden and everything living shows a way of how life works. And this mystery that exists there, the children are sometimes better at accessing that than we adults are. (Ped3)

The pedagogical work and projects are oriented on the children's interests. Their interests are the base for exploration, which is mentioned by several pedagogues:

I want to that it starts with the children's interest where one has seen what they are interested of. What does attract them and that is number one. (Ped 3)

It is partly of course from their own interest, what they get hooked for. Then one is taking up this thread. (Ped6)

The latter pedagogue (Ped6) also mentioned that the garden makes it easy to follow the children's interest and named an example of children exploring a bug where one as an adult can just "hang with them". Another pedagogue described what following the children's

interests, and the Reggio Emilia approach means for the pedagogical work and teaching.

Our Reggio Emilia Philosophy also means, I mean we could have decided to follow a potato a whole year and one knows exactly what to do which week. That is pretty easy in its own way. But we work like one takes a step and one thinks about what happens now, what did we wonder about, what did we find out. The next step goes there or there; we decide to go there, and one takes the next step and so one doesn't really know. (Ped2)

Thus, learning becomes an exploration that happens together between the children and pedagogues. In fact, several pedagogues emphasised that it can be beneficial for the shared exploration that the pedagogue has little knowledge about the object of exploration. For instance, a pedagogue stated:

I want to explore them [natural materials] on the same level together and at the same time with them [the children]. I appreciate it if I find natural materials that I myself did not explore so much yet and that the children are also interested in, that one then as a pedagogue doesn't know or doesn't have prior knowledge. Then we are on the same level most often and which means that we can go together in an easier way for me. [...] That is how I always want to have it. That I sometimes almost want to erase my memories and my experiences. (Ped5)

The pedagogue stated further that it is important not to explain or answer too fast, but to support if it is necessary:

It is how we should also work a lot with the children that we go next to the children the whole time with a supportive function that we can lay out when it is needed. (Ped5)

Similarly, another pedagogue explained that one wants to know things but that at the same time it can also be nice not to know, and stated further:

The children can also teach me. Every time one says something that one knows, it gets more obvious that one knows. [...] It gets a new, it gets a deepened knowledge to tell one's knowledge someone else. I think that is also important that one can, maybe you can tell me I have never had chickens, so I don't know, tell me. (Ped6)

The garden in relation to collaborative learning is viewed as beneficial since it seems easier to follow children's interests. It is further stated:

So, it [the garden] becomes a kind of help to learn things together with the children. (Ped11)

More precisely, it is stated that the garden teases out big questions and that the pedagogues realize through these questions and discoveries by the children that they might not have the answer. Learning becomes a life-long process. A pedagogue explained it like that:

We talked about it some time ago that easy answers just don't work. [...] That becomes quite obvious. [...] It is not possible: I know everything, I am grown up, this I know. It gets obvious. No, I don't know this, but we can figure it out together or maybe try to understand or what do you believe or what do I believe. (Ped4)

Further, the pedagogue stressed that it is important to be honest to not lose the children's trust:

The children have so many experiences so they can question because they have experienced it. [...] if one wants to have this mutual understanding, then one must be very honest to not lose their trust. [...]

One must push answers that are honest and that like the whole life is one single learning process, it gets very obvious. [...] But I think in other environments where one is blocking out this, then one can forget about that. But it is hard to ignore that here. (Ped4)

Consequently, the pedagogical work in the preschool is characterized by viewing the child as competent, their knowledge and interests are taken seriously and become part of the pedagogical processes. Learning becomes a collaboration between children and pedagogues. Explorations in and with the garden evoke big questions that make pedagogues realize that they might not have the answers. Hence, pedagogues can become learners and children can become teachers. The boundaries between teaching and learning, and teachers and learners blur in the pedagogical processes in and with the preschool garden.

6.7 CHALLENGES OF GARDEN-BASED LEARNING

The pedagogues described different challenges that are connected to the garden and garden-based learning. Recurring challenges were children's needs and interests versus the garden, having a certain order in the garden, utilizing the garden as a learning environment, and the coordination of activities and work in the garden. In the following, I will present these findings more explicitly and exemplify them with citations.

The challenge of managing the interest and needs of the children in the garden was described with different examples like the children's need to move in the garden and their will to try berries and fruits. In general, it was stated:

Challenges, big challenges are the interests of the children versus the garden versus that together, how to combine that. (Ped5)

More explicitly, the pedagogues mentioned the challenge of balancing out if it is okay to let the children eat unripe fruits and berries or if it is not okay. For instance, a pedagogue stated the following:

And in the same way that these strawberries and raspberries start to come now and the children start to pick them. Should one say no wait until they are ripe or should one offer to try the unripe to figure out how that feels? [...] It is things like that, when should one take initiative, when should one stop. (Ped2)

The pedagogue stated further:

But we are also all a bit different in how much we dare to say stop. (Ped2)

In fact, the pedagogues had also different thoughts about how to handle this challenge. Whereas one pedagogue was open to the possibility to eat unripe fruit, another stated that one must stop the children. They stated:

Here we eat unripe fruit, maybe one needs to try to eat unripe fruit and eat unripe berries. But that one saves something anyway, we need to save something ripe also, but it is their garden. (Ped10)

Or the first berries when they come that are not ripe yet. They [the children] want to pick and taste them or pick and play with them. Then one needs to stop them, they are not ripe yet. Let them be. So, that is also a challenge to let the garden be at some places anyway. (Ped9)

However, other pedagogues argued that it can vary and that there is no clear answer to what is right in that regard, but that it depends on circumstances. For instance, one of them stated further:

If one is too law-abiding and wants to know exactly how it works then it can be a challenge because then it is not easy to know, I think we all have different days and different children. (Ped4)

Hence, the question of when the children can follow their needs and interests in the garden and when not seems to be continuously in progress. A pedagogue described it like that:

This balance, when should one let the plants grow in peace and when can one pick and put them in a vase. [...] We must work with what is okay the whole time, work with where the boundaries are for what is okay and not. (Ped2)

Similarly, the children's need to move can be challenging during certain periods in the garden, which is discussed by several pedagogues:

The challenge with the garden is that when it is the planting period, springtime, that one cannot be everywhere because plants need to come up. (Ped3)

It is a difficulty maybe that it [need to move] exists in some bodies, and they must be allowed, there must be space for that also in the garden. (Ped10)

We must be quite awake; one cannot just let it be a rest garden where one can just run around, or during some periods one maybe cannot climb in a certain tree. (Ped2)

Consequently, the garden must offer possibilities that correspond to the children's needs. However, one of the pedagogues explained that it can be challenging to have a certain order in the garden and to know which place works best for which activity. The pedagogue stated:

It is difficult [...] it is a quite long process, I believe, to try to find these places that become good for something. (Ped2)

Further, the pedagogue argued that it can be challenging to have a certain order for natural materials in the garden. The pedagogue reflected the following:

But it is clear that when it is twigs and mussels, that haven't been contextualized in a way, it is clear that they are everywhere then and how should one know if it is that twig or the twig we collected. (Ped2)

The challenge and importance of having a certain order are also stressed by other pedagogues. For instance, a pedagogue explained that order is important for having a visual rest:

One needs to have a kind of order to get a visual feeling of resting, that it gets beautiful also if it is practical and also if we can play there, it should not look messy. Because there needs to be a visual rest when one comes out into the garden. (Ped8)

Further, a certain order in the garden is also necessary to work pedagogically with the children. A pedagogue described the need for more rooms in the garden that help the children to orient themselves:

But we would want to have more rooms in the room where we could feel that one knows here that is happening and even if I want to fly out, I can come back to a kind of activity that is a bit more obvious and where maybe both we as adults and the children plan what we want to think about outside. (Ped4)

The pedagogue stated further that the pedagogical work is more challenging outside because of distractions, which was also mentioned by other pedagogues.

It is a big challenge for us to think about how we can use this here more consciously because it is very easy this free and happy. They [the children] love that. That is also wonderful. But sometimes, one wants to have small corners where one knows, now we wanted to do this here. [...] outside there is so much more that attracts, so it gets more difficult. (Ped4)

At the same time, it is stated by several pedagogues that they would like to utilize the garden more as a learning environment and less as a garden for rest. For instance, the pedagogues stated:

We want to utilize it [the garden] even more, so it becomes a bit of a factor of stress oh we are inside so much, we should be more outside, we say often. We should be more outside and should use this garden less as, almost like that it gets now we have a break now the children can do what they want and we adults almost rest in a way. (Ped3)

So that is a challenge that we also view it as a classroom outside, that it does not just become a garden for rest, but that it becomes a creative place where one can also work. That it isn't just inside but that it is actually also outside. (Ped11)

It can be a well-instructed verksamhet [activities of the preschool] with that one has the freedom and the instructed closer together so that it is not just like inside we have one kind of verksamhet and outside we have a totally different. So that one merges is a challenge that we work with and try to understand. (Ped4)

Consequently, an experienced challenge is to combine the pedagogical work that happens inside the preschool buildings with the work in the garden. Moreover, the pedagogues experienced it as challenging to coordinate the pedagogical work in and with the garden. For instance, it was reported that it can be difficult to start a project in the garden and come back to it later because other pedagogues or children might have been there in the meantime without knowing what was going on at this place:

But exactly that one does something and leaves it behind [...] we will continue later. It is not certain that it looks the same when one is coming back because one does not know about each other's ideas. That is a difficulty. (Ped9)

Correspondingly, sometimes pedagogues cannot continue their work in the garden because the children's needs are more important. For instance, a pedagogue stated.

And that is a difficulty because we work with children, and we all know that it can be like one has a thought and should do something and then something happens with the children and the children always come first. And then one must let things go and one goes in and takes care of the child, and then the next pedagogue comes out and thinks what happens here, why does it look like that. (Ped8)

Further, the work that the garden requires, is also described as challenging. To exemplify:

It can also be challenging in terms of work; it needs to be taken care of. One must rake and the garden needs to be restrained [...] Because it is growing in all directions. One must limit the wilderness a bit. So, that can also be a challenge, it takes time from other things. (Ped6)

Thus, the garden becomes another part of the preschool to take care of besides the children. However, the pedagogues must have the children in focus. Therefore, it can become challenging for the pedagogues to coordinate the garden work and the pedagogical work, to communicate it with each other and the children. Accordingly, the pedagogues talked about having personnel who has responsibility for the garden:

So, the best would have been to have a pedagogue or gardener that could have had an overall responsibility for order in the outside environment because we have the children as the first priority. That is a challenge. (Ped8)

Another pedagogue explained the role of a gardener or *trädgårdista* more explicitly:

Someone that telescopes us, that holds the red [thread], exactly like the atelierista or pedagogista has an overall thought and meets everybody and knows what everybody is working with. So, it needs to be a trädgårdista, that is outside and that has the overall responsibility, to tie together. Here they have worked with this and explain what it is that happens in this corner, so we need to be a bit careful because they will continue to work with it later, but we can work there on the other side now. (Ped8)

Consequently, the challenges of garden-based learning, that the pedagogues experienced, appear between the children's, the garden's, and the pedagogues' needs. The challenges are about including another living environment into the pedagogical work and utilizing its possibilities and capacities. However, a pedagogue questioned if it is possible to reach the full capacity of the garden and stated:

There is such a capacity in it [the garden], I believe, and I do not believe that we have reached, or I do not think that we will reach it, its full capacity if there is something like that. But it is like everything, that one is never done with things. (Ped11)

7. DISCUSSION

In the introduction, it was stated that it is still unknown how the elements of the garden, the experiences in and with it relate to the pedagogical work in a Reggio Emilia inspired school. Further, this study aimed to get an understanding of the characteristics of the garden and garden-based learning in an educational environment of a Swedish preschool that is inspired by the Reggio Emilia approach and has a permaculture garden. The teachers' experiences and perspectives were central to this research study to gain an understanding of garden-based learning. In the following, I will discuss the four research questions in relation to the findings, the literature review, social constructivism, and the Reggio Emilia approach. Afterwards, I will draw a conclusion regarding the research problem and aim.

a) What becomes the preschool garden?

The findings of this study show that the garden becomes a meeting place, a physical meeting place for the pedagogues and children and a place that represents a shared understanding. The garden evokes communication and socialisation. Further, the garden becomes a place for the community where parents get involved. According to the Reggio Emilia approach, education is seen as a communal activity where parents are partaking. Hence, garden work is a way for the pedagogues to involve the parents in the preschool work. Similarly, the results from the literature review imply as well that garden work inherits the possibility for the educational institution to connect to a wider community, which is seen as beneficial for the children, pedagogues, and the place of the garden.

Further, the findings indicate that the pedagogues feel a kind of ownership of the garden when they state that it is their place, and it is part of them. Moreover, the garden creates a link between everybody. The pedagogues share similar thoughts and have a common philosophy around the garden, which seems to connect them emotionally to the garden when they share their positive feelings about it. As the research study by Sloan (2014) demonstrates, the emotional connection to the garden is beneficial for teachers to change their teaching and implement the garden into their lesson plans. It can be assumed that the emotional connection is also beneficial for the pedagogical work of the interviewed pedagogues. However, in consideration of the conducted literature review little is known about a garden being a place of a shared philosophy in an educational context, or that the garden contributes to the well-being of pedagogues because of its calming nature.

The garden becomes a place of well-being for both the pedagogues but also the children. The garden is viewed as a place where the children can move and explore freely, and that is often conflict-free. The rich vegetation is perceived as a calming element since it reduces noise and gives children the possibility to find places to rest in. Further, the garden as a place of well-being is strongly connected to its changing elements, since there is always something new in the garden, and always something to talk about. Consequently, the garden also becomes a changeable environment. The rich vegetation changes throughout the different seasons and children and pedagogues become part of it, experience it from a close perspective, influence and change it, which is viewed as beneficial for the children's learning about cultivation and the life cycle. Interestingly, the change after the summer vacation was positively stressed by the pedagogues which stands in contrast with the results of the literature review that summer

vacations can be a barrier to maintaining a school garden. However, the difference to other gardens might be that the garden is designed as a permaculture garden that needs less maintenance.

Finally, the garden becomes a living-learning environment that inherits various learning possibilities and engages the children. It is also described as a third pedagogue which corresponds with the Reggio Emilia approach. Accordingly, the garden fosters “interaction, autonomy, exploration, curiosity, communication, inquiry, and well-being” (Edwards & Gandini, 2018, p. 372). Further, in the sense of the Reggio Emilia approach, the environment of the garden becomes an active participant that also changes with the learning processes, like cultivation and exploration. It becomes a place that is taken care of by the pedagogues, children, and parents, and thus generates a feeling of well-being and belonging, which as well corresponds with the explanations of Edwards & Gandini (2018). Moreover, the garden inherits the possibility for children to learn to take care of animals and plants and develop empathy towards nature. That corresponds with the findings of the literature review that garden-based learning supports the development of embodied systems thinking (Almers et al., 2018) and with the main permaculture principle of *earth care* as described in chapter 5.3.

b) What becomes teaching and learning?

The findings indicate that teaching and learning in the garden and with its materials become a co-construction between children and pedagogues. Knowledge becomes socially constructed and the pedagogues are not instructors but rather guides that have a supportive function in the learning process. Further, the pedagogy in the preschool is focused on learning and the children’s interest. Knowledge becomes a contextually driven intra-personal creation between pedagogues and children in the context of the garden. Further, the pedagogues evoke the children’s thinking processes by asking questions and take the role of a listener. Hence, the findings corroborate social constructivism as the theoretical frame for learning in the preschool environment with a permaculture garden.

Further, learning becomes experiential learning with all senses. The natural materials of the garden encourage and are utilized for sensual and experiential learning. Similarly, Murakami (2018) noticed that “garden experiences gave children the chance to smell, taste, feel, hear, and see new and interesting things” (Murakami, 2018, p. 26). Moreover, the pedagogues acknowledge the child as competent, and they emphasise the children’s thoughts which corresponds with the positive image of the child discussed in the Reggio Emilia approach. Hence, the children become active learners and are encouraged to share their positions with each other and the pedagogues.

Edwards (2012) argue that in the process of investigating and listening, the pedagogues need to join the children’s curiosity and excitement and intend “to enter into a kind of intellectual dialogue with the group of children” (p. 151). In fact, it was stated during the interviews that the garden makes it easier for the pedagogues to follow the children’s curiosity and for learning to become an exploration between the pedagogues and children. Further, the change in the garden that the children experience supports the communication between pedagogues and children. Also, the findings reveal that it can be beneficial for a shared exploration if the pedagogues have little experience or knowledge. It came to the foreground that being in the garden as a living and changing environment evokes questions that perhaps cannot be

answered easily by the pedagogues. The pedagogues might realize that they do not know, and it is argued that they must be honest about it with the children, and consequently also with themselves. Thus, the pedagogues become learners as well, which is also acknowledged by the Reggio Emilia approach.

Consequently, knowledge is socially constructed between pedagogues and children. Learning becomes an active and contextual driven process for both, the children, and pedagogues. Teaching on the other hand becomes guiding and co-construction instead of instruction. Finally, the boundaries between teaching and learning can vanish when the pedagogue becomes a learner as well.

c) What does garden-based learning require from the pedagogues?

As the results of the research study suggest, requires garden-based learning curiosity, interest, knowledge, a will to learn and try, and responsiveness towards the garden and the children from the pedagogues. However, the analysis of the interviews indicates that most important are curiosity and interest since the pedagogues will learn about gardening if they are curious. Also, according to the previously mentioned finding learning becomes a co-construction between pedagogues and children and not-knowing is beneficial for a shared curiosity and exploration. Hence, it can as well be concluded that teachers' curiosity and interest in gardening activities are primarily important for garden-based learning. Further, lack of teacher interest was also detected as a main barrier for implementing or sustaining a school garden in the literature review.

However, the literature review also reveals a lack of knowledge about gardening as a main obstacle to implementing school gardens. Moreover, the research study by Kincy (2016) found that school gardens are more successful if someone with knowledge about gardening serves as a mentor. Similarly, it was also mentioned by a pedagogue that it "needs personnel that has knowledge about how to let it grow all year round". However, although knowledge is not necessarily required from each pedagogue, the pedagogues must be responsive to the garden and see learning possibilities.

Further, it is required from the pedagogues that they dare to try and test in the same way that the children are encouraged to try and experiment. Hence, in correspondence to social constructivism, performativity is neglected, and learning is encouraged. Moreover, if a will to learn and to try is required from the pedagogues that also means that the pedagogues must be aware of their need to learn. The pedagogues are required to be reflective and as mentioned earlier, honest towards the children and themselves.

d) What are the challenges of garden-based learning?

The results of this study suggest that the experienced challenges of garden-based learning appear between the needs of the children, the garden, and the pedagogues. The findings of this study add to the literature that it can be challenging for the pedagogues to coordinate the children's need to explore and move, and their perceptions of the garden's needs and children's learning. For instance, it was discussed by several pedagogues if children should have the possibility to taste unripe fruits. Whereas one pedagogue stated that the challenge is to stop the children, several other pedagogues viewed it as challenging since the decision can be very individual and depends on factors like the child, amount, and even the day. Hence,

garden-based learning inherits a kind of uncertainty that can be challenging for the pedagogues.

Further, to utilize the garden even more as an additional learning environment was also mentioned as a challenge by the pedagogues. It was described that the garden inherits so many things that attract the children and they feel free to explore, which can be challenging if a pedagogue wants to offer a pedagogical activity. The challenge described is to merge the activities inside the preschool buildings and outside in the garden, which the pedagogues work with and try to understand. In contrast, one pedagogue described how they could utilize the garden as a learning space when moving their pedagogical project with the children into the garden.

Contrasting to the example of the Swedish preschool successfully sustaining a garden is the finding of the literature review that a rural region harms the success of school gardens. The preschool is located in a rural region close to the ocean and the forest. However, the pedagogues did not describe any challenges considering the rural area the preschool is located in. In fact, the location close to the ocean and forest was described as beneficial since these areas were also utilized for exploration and learning.

Finally, it is experienced as challenging to coordinate activities in the garden and the work with the children since the pedagogues' priority and focus are the children. Moreover, similarly to the literature, it was found that the work of managing an additional learning environment can be challenging and time-consuming. The findings from this study, as well as from the literature review indicate that pedagogues view a garden coordinator as beneficial for garden-based learning. It is viewed as challenging to coordinate different gardening activities between the groups and pedagogues, and to keep a certain order in the garden without someone who coordinates, for example a *trädgårdista* as it was described by one pedagogue during an interview.

Concludingly, this study aimed to get an understanding of garden-based learning in an educational environment of a Swedish preschool that is inspired by the Reggio Emilia approach and has a permaculture garden. To understand garden-based learning it was also necessary to try to understand the characteristics of the garden. The findings of this case study are predominantly based on the interviews with the pedagogues, and they indicate that garden-based learning is experiential, sensual, and social learning. The garden, that becomes amongst other a changeable and living-learning environment, contributes to knowledge becoming socially constructed. More precisely, the living and changing character of the garden leads to a situation where there is always something new to explore and wonder about in the garden which in effect evokes communication between children and pedagogues. Thus, the garden provides a context for learning, where pedagogues and children can share curiosity, explore, and learn together. Consequently, garden-based learning in the context of the preschool is viewed as a life-long process, and the pedagogues are acknowledged and valued as learners as well.

As the research results reveal, the permaculture garden becomes the third pedagogue in the learning environment of the preschool. Hence, the garden becomes another actor in the

preschool, next to the pedagogues, parents, and children. Moreover, the characteristics of the garden being an ever-changing and living environment makes garden-based learning more uncertain and less controllable in contrast to curriculum-based learning. Pedagogues must be responsive towards the garden as another learning environment, another actor, and the pedagogical work must be planned step by step in response to the children and the garden. Correspondingly, the literature review implies that a main obstacle for garden-based learning to be applied, is to include the garden into the school curriculum or vice versa. This obstacle is likely connected to the garden being an uncertain and changing environment, that evokes curiosity and questions that might not correspond equally to every school curriculum or lesson plan.

Further, learning in a changing environment of a permaculture garden is deeply connected to time since following changes, also seasonal changes, in the garden requires time. Hence, learning needs to be acknowledged as a potentially lengthy process. However, Agneta Linné (2015) argues that “time sets boundaries for action” (p. 33). She stresses that time “constrains the number of actions possible in an educational context” and that “time restricts vocabularies and communicative turn taking” (Linné, 2015, p. 32). Hence, the aspect of time can restrict and impede learning processes. Linné states further that the “ways in which time is divided and classified give important clues to the selection, organisation and evaluation of knowledge” (Linné, 2015, pp. 32-33).

However, this research study indicates that it is possible to work with the restriction of time in learning processes. Knowledge can be selected, organised, and evaluated in relation to the environment and the children’s interests. Children can be given time to continuously revise and express their thoughts which allows communicative turn-taking within the learning processes. Further, garden-based learning in a changing and living environment demands and supports the acknowledgement of time in learning processes since they become real-time learning experiences when following the changes through the seasons.

Accordingly, a garden pedagogue in the study of Eugenio-Gozalbo et al. (2020) stated that “gardens are a key for educational transformation” since it “involves a will to change, and to understand that the way things are done in education can be improved” (p. 252). Moreover, Sloan (2014) found that teachers were able to foster emotional connections with the plants through experiences in the garden and that they “identified with their role in developing lessons and utilizing curriculum that built upon foundational environmental ethics, shared intergenerational knowledge, promoted interpersonal accountability that fostered emotional connections, and utilized place-based learning approaches that heightened participants’ sense of purpose and belonging within a learning community” (p. 157). Finally, this case study detected the potential that the permaculture garden and the application of a Reggio Emilia approach inherit for educational change, where performativity is rejected and learning appreciated, as well. In fact, an interviewed pedagogue reflected on educational transformation through garden-based learning:

It [the garden] becomes a kind of symbol of getting away from preconceived opinions about, about education and learning processes like how it should be in a school. So that we can show something beautiful something living something that is varying is... Oh, it happens, this environment gives children so much, us pedagogues also, it is giving a lot for free in learning, exactly like I experience the whole nature. (Ped 3)

8. CONCLUSION

In conclusion, I would like to return to the rhetorical questions stated by Gerofsky and Ostertag (2018):

Can we take a playful, artistic approach to old certainties and structures, swinging and parkouring from them rather than accepting or rejecting binary formulations?

Are we capable of working across generations and differences, skillfully navigating the landscape in unexpected ways, to find delight, life-giving experiences, knowledge, participation and community as we traverse the school and city sideways and nap alongside the strict tempo of clock time?

(Gerofsky & Ostertag, 2018, p. 184).

Considering the results from this case study and the understanding of garden-based learning, the answers must be that it is possible to swing and parkour from old certainties and structures and to “skillfully navigate in unexpected ways, to find delight, life-giving experiences, knowledge, participation and community”. However, knowing that garden-based learning can contribute to educational transformation the follow-up questions must be: Do we want educational transformation? Do we want to take every child into the garden?

Biesta (2020) argues that how education is, must depend on what it aims to achieve. More precisely, he states:

‘if one wishes to increase students’ exam scores, then it is advisable to train students as much as possible on the specific tasks in which they will be examined’, or ‘if one wishes to teach for understanding, then it is advisable to provide students with many opportunities for application, reflection and discussion’ (Biesta, 2020, p. 37)

Moreover, Biesta (2020) stresses that “the idea of education as a production process – a process of input, throughput and output – [...] only makes sense under very specific conditions [...] that can only be found in closed deterministic systems” (p. 39). However, educational systems, and especially gardens, are open, semiotic and recursive. Applying Biesta’s argumentation, the boundaries to the preschool with its garden are not closed. It is open to more variables such as the home environment or a changing outdoor environment. Further, the educational system of the preschool is semiotic in the sense that the interaction between pedagogues and children is based on communication and interpretation. Finally, the preschool system is recursive “in that the actions of the ‘elements’ in the system (i.e. teachers and students) feed back into the system and alter the direction in which the system will develop” (Biesta, 2020, p.40). Consequently, educational systems are complex and for them to work in a more predictable way (input-output), the complexity is reduced, for example through school buildings or an assessment that categorizes students’ interpretations into wrong or right.

Garden-based learning however welcomes complexity and diverse interpretations. As the findings of this case study show, the educational system of the preschool is appreciated as open, semiotic, and recursive. Introductory it was mentioned that the literature reviews of Blair (2009) and Williams & Dixon (2013) stressed the benefits of garden-based learning like a positive impact on academic outcomes. However, both literature reviews also discovered difficulties with methodologies and validity of the reviewed studies. Considering, Biesta’s

(2020) argumentation it can be questioned if the research that provides “knowledge about possible relationships between ‘inputs’ and ‘outcomes’”(p. 43) in an environment of a garden, where the inputs are diverse and uncontrollable, is the right method for assessing garden-based learning.

Further, as discussed earlier the aspect of time is crucial for garden-based learning since the learning processes are connected to an environment in seasonal change and learning becomes a long-term process. Similarly, also research on garden-based learning must consider this timely aspect and time frames for research need to be adjusted considering the changeable environment of the garden. Thus, the garden becomes not only an actor in the learning environment of the preschool but also in research processes. Consequently, also within the research on garden-based learning, the garden must be acknowledged as an actor informing and shaping the research processes. Hence, flexibility and responsiveness are required from the researcher.

Finally, the case study provided a deeper understanding of garden-based learning in the environment of a Reggio Emilia inspired preschool and thus adds new and additional information to existing literature. Interestingly, the aspect of the well-being of pedagogues or teachers in the calming, thickly foliated environment of the garden has not been addressed by any of the reviewed research studies. Hence, the aspect of the preschool garden becoming a workplace environment that can contribute to the pedagogues’ well-being, and that the garden can contribute to involve parents in the preschool work, can be interesting for employers or school leadership who want to work and develop regarding these aspects.

This study has provided a deeper understanding of garden-based learning from the pedagogues’ perspectives. Biesta (2020) claims that “a more complex understanding of the dynamics of educational processes and practices actually hints at the need for different knowledge and understanding” (p. 44). Hence, to get a more complex understanding of garden-based learning additional research needs to be conducted. This further research can contribute to a more complex understanding of garden-based learning, such understandings are critical in a time of environmental crisis.

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APPENDICES

APPENDIX 1: INTRODUCTION LETTER TO THE PRESCHOOL

Kathleen Kölz

[REDACTED]
[REDACTED]

E-Mail: [REDACTED]

Tel.: [REDACTED]

Förskolan [REDACTED]

[REDACTED]

[REDACTED]

2019-11-20

Hej!

Jag heter Kathleen och studerar på ett forskningsprogram inom pedagogik vid Göteborgs Universitet. Tidigare har jag i flera år jobbat inom förskola i Tyskland, efter avslutad utbildning inom barnpedagogik.

Mitt huvudintresse inom forskning gäller därför förskolan. Samtidigt är jag väldigt intresserad av trädgården och permakulturen, och hur trädgården och permakulturen kan bidra till pedagogiken och ett hållbart liv i samspel med naturen.

Jag har läst att ni har en permakultur-trädgård och jobbar med Reggio pedagogiken och därför kontaktar jag er. Jag är i slutet av min masterutbildning och kommer att skriva min masteruppsats nästa år. I den vill jag gärna skriva om livet på en förskola med en permakultur-trädgård.

Jag skulle bli jätteglad om vi kunde komma i kontakt och lära känna varandra. Jag kan också gärna komma förbi, så att ni får ett personligt intryck av mig.

Med varma hälsningar

Kathleen Kölz

APPENDIX 2: INTRODUCTION LETTER TO THE PEDAGOGUES

Hej!

Jag heter Kathleen Kölz och pluggar utbildningsforskning vid Göteborgs Universitet. Just nu håller jag på med min masteruppsats. Förskolan [REDACTED] har väckt mitt intresse eftersom barnen och pedagoger har möjlighet att vara, leva, leka och lära i och med en permakultur-trädgård. Jag är väldigt intresserad av att hur pedagogik och permakultur kan kopplas ihop och hur en permakultur-trädgård påverkar verksamheten av en förskola.

Därför vill jag gärna forska i eran förskola och ser, lyssna och känna på det som händer i och med trädgården. Jag planerar att vara två dagar per vecka (förmodligen tisdagar och onsdagar) från mars fram till maj på förskolan. I första steget kommer jag att vara med och observera. I andra steget kommer jag eller en pedagog eventuellt att intervjua några barn om hur de ser på trädgården.

I veckan 9 kommer ni att få ett brev med en blankett där jag beskriver lite till om forskningen och där ni kan ge eran medgivande om barnet får vara med i observationer, intervjuer eller på kort. Såklart skulle jag bli jätteglad om ni och barnen vill vara med.

Ni får jättegärna höra av er om ni har frågor eller funderingar!

Min tel.: [REDACTED]

E-Mail: guskolzka@student.gu.se

Med varma hälsningar

Kathleen

APPENDIX 3: INFORMED CONSENT TO THE PEDAGOGUES

Information om forskning och medgivande

Vem är det som forskar och vad är syftet?

Jag heter Kathleen Kölz och studerar utbildningsforskning vid Göteborgs Universitet. Just nu håller jag på med min masteruppsats. Förskolan [REDACTED] har väckt mitt intresse eftersom barnen och pedagoger har möjlighet att vara, leva, leka och lära i och med en permakultur-trädgård. Jag är intresserad av hur bildning sker i en förskola med en permakultur-trädgård.

Vad kommer att hända?

Jag planerar att vara i förskolan två dagar per vecka (preliminärt tisdagar och onsdagar) från mars till maj 2020. I första steget kommer jag att vara med och observera, vilket betyder att jag fokuserar på det som händer med och i trädgården genom att se och lyssna. I andra steget kommer jag förmodligen att intervjua några barn (eller en pedagog intervjuar) och pedagoger om hur de ser på trädgården.

Hur sker dokumentationen?

För att dokumentera observationer kommer jag att skriva upp iakttagelser i en forskningsjournal. Om intervjuer genomförs kommer jag att spela in och transkribera dem. Inspelningar kommer att raderas efter transkribering. För att dokumentera visuellt vill jag gärna ta kort vid enstaka tillfällen. Om jag tar kort kommer det inte att visas personens ansikte. Personen har rätt att avstå korttagande. Forskningsresultatet kommer att skrivas upp i masteruppsatsen och publiceras på Göteborgs Universitets websida. Alla medverkande i forskningen kommer att presenteras helt anonymt. Jag kommer inte heller att nämna förskolan vid namn. Det finns dock en risk att man kan få reda på vilken förskola forskningen handlar om, eftersom det inte finns många förskolor med en permakultur-trädgård.

Rätt att avbryta medverkan

Pedagogen kan när som helst under arbetets gång välja att avbryta medverkan utan någon särskild anledning.

Jag skulle vara oerhört tacksam om ni vill vara med. Fylla ut den nedre delen av blanketten! Tack så mycket!

Ni får jättegärna höra av er om ni har frågor eller funderingar!

Min tel.: [REDACTED]

E-mail: guskolzka@student.gu.se

eller min handledare Dawn Sanders: dawn.sanders@gu.se

Med varma hälsningar

Kathleen Kölz

Jag godkänner härmed jag _____

deltar i forskningen kring permakultur-trädgården i Förskolan [REDACTED],

deltar i intervjuer Ja Nej

får fotograferas Ja Nej

Datum, ort

Underskrift

APPENDIX 4: INFORMED CONSENT TO THE PARENTS

Information om forskning och medgivande

Vem är det som forskar och vad är syftet?

Jag heter Kathleen Kölz och studerar utbildningsforskning vid Göteborgs Universitet. Just nu håller jag på med min masteruppsats. Förskolan [REDACTED] har väckt mitt intresse eftersom barnen och pedagoger har möjlighet att vara, leva, leka och lära i och med en permakultur-trädgård. Jag är intresserad av hur bildning sker i en förskola med en permakultur-trädgård.

Vad kommer att hända?

Jag planerar att vara i förskolan två dagar per vecka (preliminärt tisdagar och onsdagar) från mars till maj 2020. I första steget kommer jag att vara med och observera, vilket betyder att jag fokuserar på det som händer med och i trädgården genom att se och lyssna. I andra steget kommer jag eller en pedagog förmodligen att intervjua några barn om hur de ser på trädgården.

Hur sker dokumentationen?

För att dokumentera observationer kommer jag att skriva upp iakttagelser i en forskningsjournal. Om intervjuer genomförs kommer jag att spela in och transkribera dem. Inspelningar kommer att raderas efter transkribering. För att dokumentera visuellt vill jag gärna ta kort vid enstaka tillfällen. Om jag tar kort kommer det inte att visas barnets ansikte. Barnet har rätt att avstå korttagande. Forskningsresultatet kommer att skrivas upp i masteruppsatsen och publiceras på Göteborgs Universitets websida. Alla medverkande i forskningen kommer att presenteras helt anonymt. Jag kommer inte heller att nämna förskolan vid namn. Det finns dock en risk att man kan få reda på vilken förskola forskningen handlar om, eftersom det inte finns många förskolor med en permakultur-trädgård.

Rätt att avbryta medverkan

Barn eller vårdnadshavare kan när som helst under arbetets gång välja att avbryta medverkan utan någon särskild anledning.

Jag skulle vara oerhört tacksam om ni och barnen vill vara med. Fylla ut den nedre delen av blanketten och lämna den snarast tillbaka till förskolan! Tack så mycket!

Ni får jättegärna höra av er om ni har frågor eller funderingar!

Min tel.: [REDACTED]

E-mail: guskolzka@student.gu.se

eller min handledare Dawn Sanders: dawn.sanders@gu.se

Med varma hälsningar

Kathleen Kölz

Jag godkänner härmed att _____

får lov att delta i forskningen kring permakultur-trädgården i Förskolan [REDACTED],

får delta i intervjuer Ja Nej

får fotograferas Ja Nej

Datum, ort

Underskrift

Namnförtydligande

APPENDIX 5: INTERVIEW QUESTIONS PEDAGOGUES

Intervju pedagoger frågor

Frågor

1. Vad är en trädgård för dig?
2. Vad är ett klassrum för dig?
3. Hur påverkar trädgården eran dagliga verksamhet?
4. Hur vill du utforska naturmaterial med barnen?
5. Vad behövs för det pedagogiska arbetet i och med trädgården?
6. Vad tror du är fördelarna för barnen med att ha en trädgård på förskolan? Vad är utmaningarna?
7. Vad betyder det för dig att ha en trädgård på förskolan?
8. Vilken roll spelar trädgården för föräldrarna?
9. Finns det något annat som jag inte frågade om som du vill berätta om?

APPENDIX 6: INTERVIEW QUESTIONS GENERAL INTERVIEW

Frågor Ateljerista

1. När startade förskolan och vem startade den?
2. När implementerades permakultur-trädgården?
3. Varför och hur var den implementerad?
4. Vilka resurser använde ni?
5. Vad tycker du är viktig för att underhålla trädgården?
Sub: Använder ni mänskliga resurser från utanför förskolan för att underhålla trädgården? Om ja, vem och hur?
Sub: Varifrån kommer material, särskilt återbrukade material, som ni använder för trädgården?
6. Om ni fattar beslut som gäller trädgården och förskolan, vem fattar dem?
7. Vad händer med trädgården på sommarlovet?