Exploring Environmental Education through the Lens of Place-Based Transformative Learning:

A qualitative case study of the Ecoliteracy Program at the Droevendaal Food Forest

"In school they can maybe teach this to you, but you will never understand it as well."

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The photographs in thesis have been used in consultation with and only after approval of the Droevendaal Food Forest. Furthermore, all recognizable faces have been anonymized. The photo on the front page is by Ising (2021).

Abstract

Following the developments of a spiritual crisis characterized by a disturbed relation between humans and nature and the connected climate crisis, this research aimed to assess a specific form of environmental education as a potential way to cope with these crises. The case that was studied is the education provided at the Droevendaal Food Forest (DFF), where children came for 10 lessons in fall 2021 to follow Ecoliteracy education. In order to study this case, the theory of Place Based Transformative Learning (PBTL) by Pisters and colleagues (2019) was adopted, in which the concepts of connection, compassion, and creativity are believed to be part of a place-based learning process that can lead to a heightened ecological consciousness. The overarching research question was to find out to what extent the activities undertaken in the Ecoliteracy program at the DFF are facilitating of such PBTL experiences. Furthermore, by answering this question the study aimed to get more insight into the effects of this education and additionally to explore the theory of PBTL and its applicability to this education. The employed methods were observations during the lessons in the DFF, interviews with 9 of the participating children, and a group discussion with 4 of the parents of these children. This data was then analyzed by means of thematic data analysis. The main results entail a description of the effects of the facilitated learning experiences during the Ecoliteracy classes. The three concepts of connection, compassion, and creativity could to some extent be discovered in the learning process of the studied population. Additionally, most children seemingly became more aware and appreciative of the natural environments of the food forest specifically and nature in general. Overall the education thus seems to have had a considerable effect on the majority of the studied children.

Key words: place-based transformative learning, transformative learning theory, environmental education, ecoliteracy education, food forests, human-nature relationship

Preface and Acknowledgments

The idea for this thesis was sparked during a project at Food Forest Droevendaal about Ecoliteracy education I was a part of during spring/summer 2021. In this project I for the first time learned about food forests, polyculture, and other concepts of alternative and sustainable agriculture. What I also noticed was how simply being in a special and immersive natural space can lead to experiences of connection with nature and a feeling of being at peace. When the project was over, I knew I wanted to continue working on something related, so I drafted this idea for a thesis. Combining my background in (social) psychology with my current studies in health and communication, I thought it would be interesting to see the effects of this place and this type of education on the participating children. Apart from the little bit of extra administration and stress that a self-chosen topic for a thesis brings, I have never regretted my choice. Writing this thesis and simultaneously being part of the Ecoliteracy team has brought me many things over the last 6 months. Next to meeting kind and inspiring people and getting to spend some time in nature for my thesis, I have learned a lot. From factual information about plants and other ecological knowledge, to doing observations and interviews by myself for the first time and learning more about the pedagogy of providing and organizing alternative education. The process was stressful sometimes, but at least I knew what I was doing it for.

For guiding me through the process and being there for me when necessary, I want to thank a few people specifically. First, I want to thank Lenneke for the supervision over the last months. I appreciate how you helped me shape this thesis and were always willing to provide helpful insights and feedback or discuss ideas. I am also thankful for how you were interested in not only my project but also in how I was doing outside of that. Additionally, I was happy to be part of an informal HSO thesis ring, in which I could discuss all my questions with Annemieke, Emma, and Mellany.

Second, I am grateful for the way in which I got to become a part of the Ecoliteracy team at the Droevendaal Food Forest. Thank you for being curious about my project; helping me plan certain activities when necessary; but mostly for the fun that we had together during the lessons and with the children. Additionally, I also want to thank the participating children that I got to know over the last few months, for giving me energy on a Friday afternoon, for being honest in their answers, and for providing me with their fresh and random perspectives on everyday topics.

Finally, I want to thank my friends and family, for sticking with me and remaining interested and supportive throughout my project. Thank you to those who helped me on a conceptual level by brainstorming and discussing the topic. Thank you to those who saw when I could use some distraction from working on my thesis and who took me out for coffee in the sun. Especially I want to thank Jip, who has sat with me (almost) every day from the beginning of September towards these last sentences in March. Writing your thesis is an individual task, but simultaneously doing something individually is nicer than doing it all by yourself. Thanks for being there, for the support, and for the never-ending words of encouragement: Wij kunnen dit en het komt goed!

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Introduction

The stance that climate change is fake is difficult to uphold after the recently published report of the Intergovernmental Panel on Climate Change (Masson-Delmotte et al., 2021). The climate is changing rapidly and human behavior has been determined as one of the main causal factors (Masson-Delmotte et al., 2021). The report states that this kind of climate change is "unprecedented over many centuries to many thousands of years" (p. 9) and that it is already influencing every inhabitable place on earth through changes such as an increase in extreme weather (Masson-Delmotte et al., 2021). In short, climate change is maybe the most influential wicked problem of this time and action is needed sooner rather than later.

Meanwhile, people seem to be growingly disconnected from nature, a development mostly driven by urbanization and technological change (Kesebir & Kesebir, 2017). More and more people are living in urban areas, cut off from nature. Additionally, changes in the ways people spend their free time, think of watching television or playing videogames have furthered the disconnection (Kesebir & Kesebir, 2017). Especially for the younger generations there have been concerns about the amount of time spend behind screens (Stiglic & Viner, 2019). This growing lack of connection to nature is for example visible in the decrease of references to nature in cultural products such as books and movies (Kesebir & Kesebir, 2017). While this first of all shows that nature is a smaller part of people their lives, these products also reinforce certain ways and practices and through that shape future trends and worldviews again, leading to the continuation or an even bigger decrease in nature's importance (Kesebir & Kesebir, 2017).

This increasingly diminishing relationship between humankind and nature has negative effects in both directions. First, the fact that being in nature or green environments has quite some positive effects on humans has been broadly acknowledged in the relevant research fields. Being in natural environments has for example been proven to increase positive and decrease negative affect (McMahan & Estes, 2015); those more connected to nature experience higher eudemonic wellbeing and personal growth (Pritchard et al., 2020); and similarly there is an established connection between being connected to nature and being happy (Capaldi et al., 2014). Additionally, having a connection to nature is correlated to more pro-environmental behavior, with a small but significant causal effect of connectedness on behavior (Mackay & Schmitt, 2019). Consequently, as people feel less connected to nature, they do not only miss out on these positive effects, they also care less about the environment.

Following the abovementioned developments, it is deemed essential to rebuild the human-nature relationship in light of the bi-directional positive influences. Not only will people likely become happier and healthier when they are more connected to nature, a healthier and more positive relationship between both is also necessary to fight the current climate emergency (Liefländer et al., 2013). One way that has been put forward to work towards this is through (environmental) education (Liefländer et al., 2013). A classic definition of the concept is the one coined by Stapp and colleagues:

> "Environmental education is aimed at producing a citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution." (1969, p. 34).

Environmental education can be beneficial to everyone, but a school setting makes it easy to reach a great subset of the population. When it concerns educational programs for schools, it is recommended to, next to the cognitive aspect, also include "affective direct experiences with nature" (Milbrath, 1994, as cited in Liefländer et al., 2013). When being emerged in the natural environment it may lead to the development of positive attitudes and feelings towards nature and it can also facilitate a deeper understanding or empathy with it (Davis, 1998). Children also have an adventurous mindset and are playful in the way they approach things, which may positively influence the experience of such education. It is already known that spending time in nature is beneficial for the social and psychological development of children (e.g. Almers et al., 2018). A great variety of desired outcomes have been reported in research, among which "increased interest in eating vegetables and fruit, better academic results, improved environmental knowledge and concern for the environment, improved motor fitness, improved social skills, a stronger sense of place, and higher self-esteem (e.g., Blair, 2009; Gill, 2014; O'Brien & Murray, 2007; Rickinson et al., 2004)" (as cited in Almers et al., 2018, p. 242). When starting young, they will probably take this newly found appreciation and gathered knowledge of nature with them in their future lives and careers, leading to a generation that is concerned for and passionate about nature and its conservation. Considering the aforementioned crises, namely the environmental one as well as the spiritual one characterized by a disconnection between all layers of life, the question arises what it is that the future generations need to be taught most. It is arguable whether the skills nowadays still prevailing in classrooms will still be most important and beneficial to those growing up in today's world. Regardless of the answers to such questions, embedding environmental education in the curriculum of children seems to be a good choice either way.

Contrarily, while environmental education seems to be one of the vital tools to deal with the current climate crisis it is "characterized by a paradox: whilst few would doubt the urgency and importance of learning to live in sustainable ways, environmental education holds nowhere near the priority position in formal schooling around the world that this would suggest" (Palmer, 2002, p. 1). Nearly two decades after Palmer's quote, educational programs about the environment and nature are part of most schools in some way or another, although they are still not holding that priority position. For example, primary schools (only) have to spend one hour every week on nature and environmental education in the Netherlands, yet exact information on how and whether this happens is lacking (Sollart & Vreke, 2008).

Over the years it has also been questioned whether environmental education has been achieving the desired and intended results. Wells and Lekies (2006) found for example that "participation in environmental education programs (…) was not a significant predictor of either environmental attitudes or behaviors." (p. 14). They also hint at the fact that this finding may be

due to a focus on more structured and formal kinds of education, provided in classrooms, as compared to more practical versions in which nature is more directly experienced, which are more likely to have a longer lasting effect on children (Wells & Lekies, 2006). In research conducted by Dale and colleagues (2020) on settings for environmental education, some characteristics of natural settings were found to positively influence student outcomes. These characteristics are the naturalness of the setting and how novel it is, when place-based education is used, and spending time outside rather than inside (Dale et al., 2020). In short, they found that environmental education provided in more natural settings led to more positive outcomes.

The Case

Food forests are one possibility for providing education in a natural setting. While research in some other settings (see e.g. Dale et al., 2020) such as school gardens or regular forests in combination with environmental education is more prevalent, food forests are just beginning to be explored for such purposes (Almers et al., 2018). Food forests have been gaining popularity over the past few decades as being a more sustainable and nature-inclusive way of thinking about and doing agriculture and food production. A food forest is a polyculture in which many layers, usually seven[1] (see Figure 1), work together to ideally act as a self-sustaining and self-sufficient ecosystem (Groot & Veen, 2017). According to the official definition a food forest should be at least 0.5 hectares. In a food forest the setup of a natural ecosystem is mimicked (Groot & Veen, 2017). Much thought goes into the design of a food forest to make sure that it is a place where various plants and other forms of life mutualistically reinforce each other, increasing and fostering a high biodiversity.

[1] "The top layer is the canopy or tall tree layer with trees around nine meters high, mostly nut and fruit trees or nitrogen-fixing trees. The second layer is the low tree layer, with trees between three and five meters in height, "The top layer is the canopy or tall tree layer with trees around nine meters high, mostly nut and fruit trees or nitrogen-fixing trees. The second layer is the low tree layer, with trees between three and five meters in height, mostly fruit trees. Layer three contains shrubs, between the small trees. These are mainly berries, fruit, nut and currant shrubs, but can also be medicinal and flowering shrubs. In the herbaceous layer underneath, one finds perennial plants without woody stems, such as medicinal herbs and bee-forage plants. The fifth layer is the rhizosphere, consisting of root crops like potatoes or carrots. The soil surface, which fills the remaining space on the ground, protects the soil and prevents weeds from growing. The final layer is vertical, consisting of vines and plants that climb trees, such as grapes, berries or beans. It is possible to add layers, such as a wetland layer or fungal layer." (Groot & Veen, 2017, p. 34)

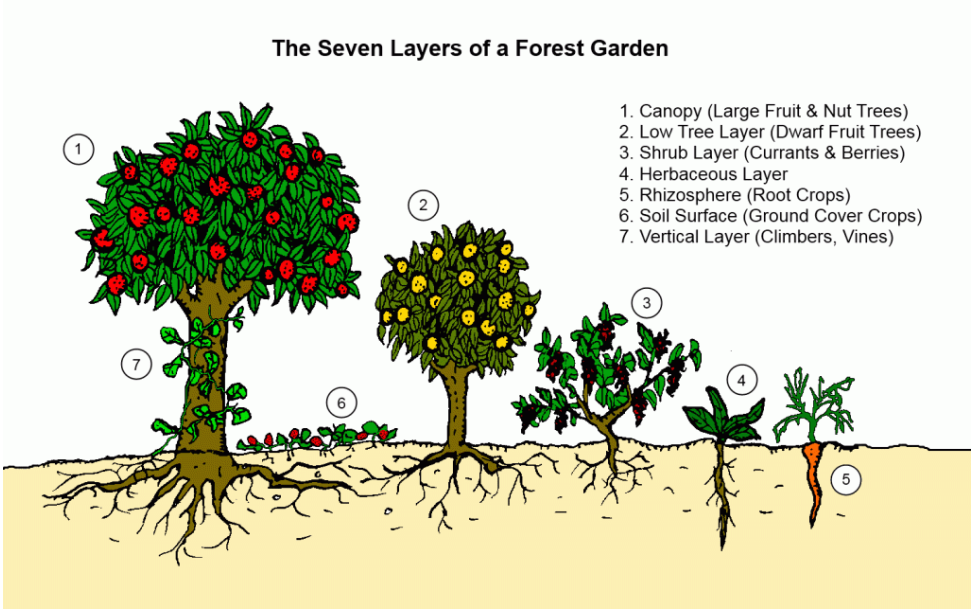

Figure 1: Seven layers of a food forest (Eliades, 2011, as cited in Groot & Veen, 2017, p. 34).

At the Droevendaal Food Forest (DFF) an educational program for children has been developed: the Ecoliteracy program. This specific case will be the focus of this research. They have been working on this program for a few years and it is being co-created with several volunteers, mostly people with great ambition and a passion for nature and children yet little educational background. It is also volunteers who design and plan the lessons and who teach the children, mostly students from Wageningen University. Members of this teaching team are mostly referred to as facilitators. Both in fall and spring a group of children of about 9-12 years old comes to the food forest for 10 lessons, as part of their educational program. These lessons take place on the Friday afternoon and include 30 minutes of eating lunch together with the facilitators, or teachers, and one and a half hours filled with educational content. In the program they use the concept of Ecoliteracy as compared to environmental education or other similar terms. While there does not seem to be one agreed-on definition of Ecoliteracy (McBride et al., 2013), the following are the five main principles, as composed by Goleman and colleagues (2013), about which most seem to agree the concept is based on:

1. “Develop empathy for all forms of life” (para. 10)
2. “Embrace sustainability as a community practice” (para. 13)
3. “Make the invisible visible” (para. 17)
4. “Anticipate unintended consequences” (para. 21)
5. “Understand how nature sustains life” (para. 25)

As can be read in these principles, Ecoliteracy encompasses more than simply gathering knowledge on environmental topics. In practice, a way of implementing the concept in education

is through the use of the following four competences, as defined by Capra (1997/2002/2013 as cited in McBride et al., 2013, p. 15):

1. Head or cognitive: understand ecological principles; use a systems perspective; think critically about impacts and effects;
2. Heart or emotional: care for and respect all living things; commit to justice for all;
3. Hands or active: be creative and be able to use tools and procedures; be practical and effective;
4. Spirit or connectional: experience the wonders of nature; feel connected to and kinship with the earth and all living things.

Within the Ecoliteracy program at the DFF they actively try to include these principles and competences in their education. Their Ecoliteracy program therefore tries to go above and beyond regular environmental education in which the focus mostly lies on gaining ecological knowledge.

Theoretical Framework

Transformative Learning

The conceptual framework of Transformative Learning is the broader lens used to explore the educational program at the DFF. This theory, which was developed by Jack Mezirow, is based on research with women re-entering the educational system (1978, as cited in Kitchenham, 2008). During this research, Mezirow and colleagues were interested in what factors either facilitated or deterred this process of going back to school. They eventually found 10 steps (see Table 1) people could go through to reach some sort of personal transformation that was seen in the participants (Kitchenham, 2008). The theory of transformative learning is influenced by several other significant theories, mostly those by Kuhn on paradigms (1962); Freire's concept of conscientization (1970); and the domains of learning by Habermas (1971, 1984) (as cited in Kitchenham, 2008).

Table 1: Ten phases of transformative learning (Mezirow, 1978, as cited in Kitchenham, 2008, p. 105).

Phase 1	A disorienting dilemma
Phase 2	A self-examination with feelings of guilt or shame
Phase 3	A critical assessment of epistemic, sociocultural, or psychic assumptions
Phase 4	Recognition that one's discontent and the process of transformation are shared and that others have negotiated a similar change
Phase 5	Exploration of options for new roles, relationships, and actions
Phase 6	Planning of a course of action
Phase 7	Acquisition of knowledge and skills for implementing one's plans
Phase 8	Provisional trying of new roles
Phase 9	Building of competence and self-confidence in new roles and relationships
Phase 10	A reintegration into one's life on the basis of conditions dictated by one's perspective

Mezirow developed the following definition of the concept:

> "Transformative learning is learning that transforms problematic frames of reference—sets of fixed assumptions and expectations (habits of mind, meaning perspectives, mindsets)—to make them more inclusive, discriminating, open, reflective, and emotionally able to change." (2003, p. 58).

In other words, this theory was developed to look at specific changes people can experience when going through learning experiences. The main idea of this is that people go through various stages of critical (self-)assessment and examination, the learning component, to eventually reach a transformed sense of self (e.g. Mezirow, 1997). According to the theory, this process is initiated by some kind of disorienting dilemma that is experienced which motivates someone to change their ideas (e.g. Mezirow, 1997).

This theory was originally meant to get a better insight into adult learning. Mezirow (1997) discusses how "[n]ew information is only a resource in the adult learning process." (p. 10), since new information should become incorporated or integrated in the already existing knowledge structures and frame of reference carried by that person to become meaningful. In short, prior knowledge and references are needed to be able to shift views and to be able to transform certain parts about the sense of self and the way in which things are looked at and approached.

Place-Based Transformative Learning

Pisters and colleagues (2019) have tried to deepen the theory of transformative learning by arguing how this mindset-shift facilitated through transformative learning is inherently place-based, especially when it concerns sustainability related matters. Within this newly developed theory of Place-Based Transformative Learning (PBTL), place-based is defined as "geographically bounded and shaped in the interaction of individuals, groups and their environment" (Pisters et al., 2019, p. 2). In short, the transformative process that can happen in

learning experiences is relational and context dependent. Based on a critical literature review they found three main themes, "(re-)connection, (self-)compassion and creativity" (Pisters et al., 2019, p. 1)**,** on which they have built a more elaborate theoretical framework**.** Before discussing these three building blocks, first the notion of ecological consciousness and its relevance within this framework will be described.

Ecological consciousness. Ecological consciousness is necessary according to some for a shift to more sustainable ways of living (Pisters et al., 2019). To be(come) ecologically conscious includes being (more) sensitive to not only your own life but to all life around you (Pisters et al., 2019). It also entails the notion of interconnectedness and with that the interdependence of all different forms of life, human and non-human, in which all are equal and within which one should not assert dominance over others (Pisters et al., 2019). A shift towards a higher ecological consciousness encompasses not only thinking but also feeling, behaving and even being differently (Pisters et al., 2019).

While not being the same concepts, some similarities between a shift towards an ecological consciousness and the principles behind and goals of the educational Ecoliteracy program can be seen. Both value and argue for a holistic approach, in which not only everything is regarded as interconnected but also as interdependent. Within PBTL exploring sustainable ways of living; learning about the experience of the non-human; and embodiment are central notions (e.g. Pisters et al., 2019). All these notions also take up a considerable part of the Ecoliteracy program, as it aims to increase interest in and knowledge of sustainability; it focuses on all aspects of nature and their interconnectivity; and the setting also amounts to the experience of embodiment. The setting of a food forest is also a logical choice within this framework for other reasons, as learning situations within this setting are facilitative of experiencing the described interconnectedness and interdependence (Askerlund & Almers, 2016). Providing the program in this setting also already considers and almost inherently integrates some of the Ecoliteracy principles, as the setting helps to understand how nature sustains life; to regard nature as a teacher; and to be empathic to all forms of life experienced in the forest. Further, it is supposedly easier to include practical, emotional, and spiritual components in education when it takes place in the food forest, as the setting is actively part of and adds to the experience of the lesson.

The three C's. The following paragraphs will shortly summarize the three themes as developed by Pisters and colleagues (2019) in the PBTL framework.

Connection. (Re-)connection could be regarded as the main part of ecological consciousness, as it is about the "interconnected nature of all life" (Pisters et al., 2019, p. 4). This concept is rooted in the experience of foreign or different places and behaving in ways which are responsible and which take into account the consequences of actions (Pisters et al., 2019). It entails an openness towards other cultures and people and an appreciation of and interest in

diversity rather than being uncomfortable or cautious towards people who are different or unknown and foreign situations (Pisters et al., 2019).

Compassion. (Self-)compassion is the second important theme within the notion of ecological consciousness and links the two other themes (Pisters et al., 2019). It entails being kind to oneself and mindful towards one's thoughts and feelings (Pisters et al., 2019). Interpersonally it also means that one is engaged with others and wanting to care for them (Pisters et al., 2019). Being compassionate or feeling (self-)compassion has also been connected to having more pro-environmental values and intentions (Pisters et al., 2019). This makes sense, also considering the theme of connection, as people are probably more likely to feel compassionate towards nature and other forms of life and willing to care for these when they experience they are part of this bigger system including all kinds of life (Pisters et al., 2019).

Creativity. The last theme is creativity and is mostly concerned with externalizing the implicit concept of consciousness and all it entails (Pisters et al., 2019). It is about finding creative solutions to deal with problems and the criticized old situation (Pisters et al., 2019). As practices make up a considerable part of human behavior and how by doing certain things they are also reinforced again, changing these practices makes sense when aiming for a shift in consciousness (Pisters et al., 2019). Creativity and living creatively also helps one to shift their focus from having to being, as it can help to express oneself, leading to an increase in sense of identity (Pisters et al., 2019).

In a renewed version of the framework (Pisters et al., 2020), a fourth theme was added: transgression. Pisters and colleagues (2020) defined this as "the will and initial motivation to transgress current dysfunctional systems" (p. 403). While the added importance of this theme certainly becomes clear in the cited paper, in which life stories of people living in ecovillages are being analyzed by looking at their experiences with transformative learning, it is less relevant for this current research. Where people deciding to live in ecovillages make a conscious choice and are motivated to try a different lifestyle, the children following the Ecoliteracy program did not personally choose to participate in this as it is simply part of their education.

In the paper they also discuss how the PBTL framework "can be used empirically to research the extent to which people involved in place-based sustainability initiatives develop an ecological consciousness" (Pisters et al., 2019, p. 1)**.** This framework is therefore a good fit to this research, as it could be used to see how and to what extent the participants go through this process of transformative learning, in which the three C's (connection, compassion, creativity) can act as guidelines. The researchers additionally explicitly mention the need for using this framework in research projects to further the development and anchoring of it (Pisters, 2019), which simultaneously provided this project with a theoretical knowledge gap to attend to.

Societal and Scientific Relevance

In order to shortly summarize the introduction as well as the theoretical framework and to simultaneously determine the importance of this research, it is necessary to discuss the theoretical gaps this study will add to and the societal relevance of the chosen topic. From a societal perspective, this research gives an insight into potential ways in which the currently broken human-nature relationship could be restored. By focusing not only on the environmental crisis but also the spiritual one that is connected to it this research tries to take a holistic stance. On a more local level, this research also gives some insights into the effects and learning experiences happening in the educational program at the DFF. From a theoretical viewpoint, this research adds knowledge on several topics: it further explores food forests as a setting for education; it empirically explores the newly developed theoretical framework of PBTL; and it simultaneously provides insights into the ways in which children experience and value nature, as more information is needed to understand the meaning children attach to nature (Adams & Savahl, 2017, as cited in Hammarsten et al., 2019).

Research Questions and Objectives

Considering the discussed problem statement concerning a lost connection between humans and nature in combination with the theoretical framework of PBTL, the following objectives and research questions were developed:

Objectives

1. To get more insight into the psycho-social influence of the Ecoliteracy program in combination with the setting of the food forest on the children participating in this education.
2. To explore the theoretical framework of Place-Based Transformative Learning and see whether and/or how it applies to this specific learning situation.

Research Questions

To what extent are the activities undertaken in the Ecoliteracy program at the Droevendaal Food Forest facilitating of Place-Based Transformative Learning experiences?

1. How does the behavior of the children reflect the concepts of (re-)connection, (self-)compassion, and creativity?
2. How do their cognitions and emotions reflect the concepts of (re-)connection, (self-)compassion, and creativity?
3. How do children perceive nature as a result of the program in the food forest?

Methodology

Design

This research was a multimethod case study at the DFF. The study took a qualitative approach in which data was collected in an exploratory or inductive manner. As Almers (2013, as cited in Almers et al., 2018) so clearly described, an exploratory approach is fitting for this research, as it is being conducted from a constructivist point of view, in which reality is seen as a complex whole in which people describe personal meaning to experiences instead of the belief that there would be one universal truth for all. This fits this study as the goal was to reflect on feelings about lessons and experience of place, focusing on personal meaning and experiences, not on finding a generalizable effect or overarching truth.

Setting

The research was mainly conducted at the DFF. This food forest was started about 3 years ago and is based on top of a 20-year old organic orchid. It is based in Wageningen, in the province of Gelderland in the Netherlands. More specifically, this food forest of about 1 hectare is set on the grounds of Wageningen University and Research (WUR) and it is a place where students are invited to conduct all kinds of research for their studies (Van Veluw, 2020). The idea for this place was that it would be a multifunctional student- and community supported food forest (Van Veluw, 2020). Some other goals of the DFF are to produce a high amount of food; to improve all ecosystem services; to help the community and those who participate in the food forest to become more ecoliterate; and to provide others with an example (Van Veluw, 2020).

Sample

Children. The main studied population is a group of about 36 children between the ages of 9-12 from primary school De Prinsenakker in Bennekom, The Netherlands. These children follow Eureka education, a program for highly gifted children. This type of education is developed specifically for this target audience, and has the goal to challenge these children sufficiently during their time at school (De Prinsenakker, n.d.). Following the Ecoliteracy program at the food forest is one of the extra activities they participate in next to more conventional subjects (De Prinsenakker, n.d.). The children already know each other, as they are in school together, and most have a similar background, culturally as well as socio-economically. They are mainly Dutch and most come from well-off families in the (upper-)middle class (Van Neste, n.d.).

As explained in the theoretical framework, the concept of transformative learning was originally developed as a theory for adult learning. Yet it could be argued that children also already have developed frames of reference through which they understand their world and their specific experiences in it. Furthermore, the characteristics of the participating sample made it interesting to see if and/or how the theory of PBTL is reflected in their learning process. These children are actively supported in their social-emotional development, follow courses in philosophy, and are guided in training their executive functions (De Prinsenakker, n.d.). It is therefore not unimaginable that they also go through similar learning processes as most adults. In short, while “[t]ransformative learning requires a form of education very different from that

commonly associated with children" (Mezirow, 1997, p. 10), this does not necessarily mean that this type of learning does not happen in children.

This sample was not specifically chosen for this research: the lessons were already planned and the children would have come to the food forest regardless of this research happening, thus this research took an approach of convenience sampling. Yet, it appeared to be a fitting sample. Liefländer and colleagues (2013) namely found that "strengthening connectedness to nature is more sustainable before the age of 11" (p. 370) in their research on environmental education for children, an age below which the majority of the sample falls.

Parents. Next to the main sample of children participating in the Ecoliteracy classes, a second part of the sample of this research consists of some of the parents of these children.

Data collection

The data was collected using three different data collection methods: observations, interviews, and a focus group. This multimethod approach, or triangulation, helped to get a broader understanding of the studied matter (e.g. Patton, 1999, as cited in Carter et al., 2014). Triangulation as such has the potential to improve the validity and credibility of the final conclusions as it made it possible to compare the results from the various employed methods which may help to come to a more robust and substantiated answer to the research questions.

Figure 2: Children having lunch in the food forest (Ising, 2021)

Observations. During 5 lessons the behavior of the (about) 36 children was observed on a group level, namely during lesson 2, 3, 4, 6, and 7. Lesson 1 was an introduction lesson, which the researcher used to get to know the place; the other teachers at the food forest; and the

children who came for the first time. During this first lesson no systematic observations were carried out, however, an account of the activities and general mood was written up. During lesson 5 the researcher could not be present at the lesson as a result of personal circumstances. Lesson 8 was canceled due to the children having to quarantine, as some of them got infected with COVID-19. During lesson 9 and 10 the researcher did not observe anymore as during these lessons the interviews were conducted. All lessons started with half an hour in which the facilitators and the children could have lunch together in the food forest, as shown in Figure 2. All lessons except for the last one took 2 hours (12:00-14:00), the last lesson took slightly longer to make up for the missed lesson (10:45-14:00). The lessons had an overarching theme, namely 'the story of change'. In every lesson the activities and discussed theories were based on an aspect of this theme. The researcher wrote a report about every lesson including information about 1) the educational content and activities of the lesson, 2) the general impression of how the children behaved and how the mood and the atmosphere were, and 3) specific noteworthy behavior of the children. Noteworthy in this sense meaning behavior that could help in any way to answer the developed research questions. This logbook and a summary of the observations can be found in the Results section.

The used observation style can be described as a combination of naturalistic- and participant observation. As the researcher was also part of the teaching team she was involved with the children on a more personal level, yet she was not actually part of the group of studied children nor implied or acted to be. The naturalistic part entails that the observations took place in the food forest, so in the setting where the education is provided. This combination allowed the researcher to not only hear from the experiences of the children, but to also partly experience them herself, leading to a more immersed understanding of the concepts and experiences studied.

Procedure. When the children would come in every lesson, the researcher would already be in the food forest with the rest of the teaching team. The researcher would mostly sit somewhere next to the activities to be able to make notes on the behavior of the children. Sometimes the researcher would join the activities, and afterwards write down some notes on that specific activity.

Interviews. During the last two lessons, 9 children who had been visiting the food forest were interviewed. This sample size was based on the children their voluntary participation, their parents' approval, and feasibility for the researcher timewise. Concretely, these 9 children (out of the 36 in total) were the ones that got parental approval to be interviewed. The interviews were meant to get a deeper insight into the emotional and cognitive aspects of their learning experiences in the food forest.

The interviews took place in the building on the terrain of the DFF. As Hammarsten and colleagues (2019) described, conducting the interviews here, as compared to for example a university room or their own school, was important as it would be easier for the children to remember and reflect on all parts of their experiences when they are in the same space. In light

of the specific sample of young children, the researcher tried "to make these 'conversations' nonthreatening, more participatory and individualized to the interviewee" (Coyne & Carter, 2018, p. 104). For conducting the interviews it was helpful that the researcher already knew the children from the lessons, as it visibly made them feel more comfortable in the presence of the researcher which seemed to help with sharing more truthfully their thoughts and feelings.

The duration of the interviews varied between 9.38 and 24.43 minutes, with an average of 13.47 minutes. The interviews were semi-structured, which is deemed appropriate for this type of research (e.g. Dejonckheere & Vaughn, 2019). In practice, it meant that the researcher developed an interview guide to guide the conversation, yet whenever the researcher deemed it appropriate to ask more questions or to skip one, for instance when clarification was needed or when something was already discussed, this was allowed. The interview guide was based on an interview blueprint, which was created through thorough analyzation and dissection of the research questions. This blueprint and the interview guide can be found in respectively Appendix A and B.

Procedure. During the second lesson in the DFF, one of the activities that the children engaged in was to write a letter to their future self. The researcher had written out a few questions for the children, which they could fill out. The template for this 'letter to themselves' can be found in Appendix C. The researcher explained the exercise by telling them how it would be interesting to see in a few months how personal ideas and feelings about the lessons and the food forest may have changed. This explanation fitted in the topic of the lessons as well, as the focus this season was on change in the broad sense. When the children filled out these letters, they were put in a big box and stored in the building next to the DFF. During the two last lessons, the children were interviewed. At the beginning of these lessons one of the facilitators mentioned how some of the children would be asked to be interviewed today, and mentioned the names of those that could be asked. These names were based on the children that got parental approval to be interviewed, see also sections 'Interviews' and 'Ethical Considerations and Data Management'. Like this, the children were informed and able to think about whether they wanted to join and what was going to happen. One by one the children were asked to join the researcher inside. When they came inside they first small talked a little bit, mostly about the weather and the lesson of that day. When they both sat down, the researcher asked the child if they wanted to be interviewed. When they agreed on this, which all asked children did, the researcher explained shortly what the research was about. Furthermore the children were orally asked for informed consent, and were asked if recording the interview was alright. They were also reminded of their privacy and the anonymity of what they would say. A more elaborate version of these steps can be found in Appendix B. After this, the interview took place. During the interview, questions were asked about how the children felt in the food forest and how they reflected on the lessons. After these questions, the participant and the researcher together reflected on whether things had changed or had stayed the same, based on the 'letter to themselves'. This 'letter to themselves', and the answers they had given at the start of the lessons, was meant to help them remember how

they felt about the food forest and the lessons at the beginning. This may have made it easier to think back and compare their answers of then to the answers they had given just now in the interview. After the interview, the children got a cookie and the researcher thanked them for their contribution. The child would ask one of their peers to come inside for the next interview.

Focus group. After the last lesson, on December 14, 2021, an online focus group discussion took place on teams in which 4 of the parents of the children participated. All parents of the children were invited to participate this focus group, yet only these 4 responded and were able to join on the designated day and time. An invitation to participate was sent out via the teacher of the children, in which they were asked about approval to let their child be interviewed and they could also express an interest to be approached for this focus group. This letter can be found in Appendix D. In consultation with these interested parents, a time and day was chosen that worked for most of them.

During the conversation, the parents could share their insights about how they have experienced their children over the course of the Ecoliteracy program. Questions were asked concerning the behavior of the children at home connected to the principles taught in Ecoliteracy; which things they talk about; what, if anything, they took home; or what they seemed to have learned. The parents answered these questions based on how they experienced their children outside of the lessons.

Procedure. The participants joined the Microsoft Teams meeting at 20.00 in the evening on December 14. After everyone shortly introduced themselves, the researcher shortly talked about the study at hand, without giving away too much detail in order to try to minimize responses led by desirability bias. Then, the setup and rules for the group discussion were explained and the participants were asked whether they consented with the conversation being recorded. When they all consented to this, the conversation started. An overview of the full procedure and the discussed topics can be found in Appendix E. The conversation lasted 22.08 minutes in total, after which the participants were thanked for their participation.

Analysis

After the data was gathered in the various research activities, it was organized and transcribed, making it ready for analysis. In the process of transcribing the data, the researcher first of all made sure that the individual interviewees would not be recognizable, by deleting their names and using numbers instead. Furthermore, in order to improve readability words and parts of sentences such as ‘uh’ and other in the context meaningless parts were removed. Introductory and closing sentences were also left out, as these were not related to the content of the interviews. When names of other children or teachers were mentioned in the interviews, these were replaced with, for example, |*name teacher*|, in order to ensure anonymity of those involved in the lessons.

The data has been analyzed by means of thematic content analysis as described by Braun and colleagues (2008). In short that meant that the researcher first familiarized themselves with the data, by means of transcribing the gathered data and reading through it several times. When the researcher felt sufficiently comfortable and familiar with the data, the program Atlas.ti was used to generate initial codes in the data. More specifically, while going through the data, the researcher looked for bits of data, e.g. paragraphs, sentences, or groups of words which could be helpful in answering the research questions. When coding, the codes were labeled so that it would remain clear which codes belonged to which specific method (observations; interviews; group discussion). Hereafter, codes were categorized in groups in Atlas.ti, according to their topic. Examples of these groups are *People*, *Nature*, and *Lessons*. After categorizing the codes in these groups, the researcher looked within these groups to see whether there were codes that overlapped or were too similar. If this was the case, the codes were merged. Some codes were also deleted, when on second thought they were not relevant in connection to the research questions. The full list of codes was subsequently read through a couple of times, again to get more insight into trends in the data. While keeping track of these trends by means of writing them down and additionally finding new links and topics emerging from the condensed data, the researcher started to organize these codes into new categories. This was done by going through the codes one by one and putting those about similar topics together, adding new categories when a code did not fit with those already made. Within these developed categories, the researcher again went over them to look for meaningful connections, stories, and also potential outliers to these.

Based on this analysis, the results were written out, in which the results from the observations, the interviews, and the focus group discussion were discussed apart from each other. The observations were combined with descriptions of the individual lessons, in order to create a clear overview of what was done in the lessons and also to make the discussion of trends in the observations more sensible. The results from the interviews were discussed in light of three themes (doing, being, relating) as these emerged from the earlier developed categories as well as that they fitted the questions asked in the interviews. Finally, the group discussion was reported on by describing the main topics that emerged from the earlier developed categories, making sure to cover the topics that were discussed in the conversation.

Ethical Considerations and Data Management

Prior to the execution of this research ethical approval had been requested from the Wageningen University and Research Social Sciences Ethical Committee. This approval has been received on October 20th, 2021. Furthermore, the facilitators at the DFF, the teacher and the parents of the participating children were informed of the research. The facilitators were informed during the preparations, before the lessons had started. The teachers of the children were informed during the first lesson. Through one of the teachers, the researcher sent a letter to

the parents of the participating children, in which the researcher explained the study and asked for permission to interview their children and it also asked for their potential interest to join the focus group discussion that would take place after the lessons. Only those children of whom their parents agreed to have them partake in the research were approached to be interviewed. At this point, the children could also still decide for themselves whether they wanted to participate. Likewise, only the parents who agreed to partake in the focus group were sent an invitation. Finally, before the interviews and the focus group the researcher made sure to accurately expand on the study and the procedure of the activities. A more elaborate overview of the ways in which consent was asked for and in which procedures were explained, see Appendix B, D and E.

Furthermore, in the study data was collected on the socio-emotional and cognitive experiences of children during their learning process. While any direct risks were not foreseen, and indeed none seemed to have occurred, these topics are considered to be sensitive and should thus be treated as such. In order to guarantee confidentiality, only the researcher has had and will have access to the relevant documents. The data will remain anonymous and is reported either on group-level or in anonymized ways so that it is not possible to identify individual participants. Furthermore, upon completion of this study the data will be stored safely at the HSO directory.

Next to the measures taken to guarantee consented practice and data confidentiality, the researcher also tried to make sure the children were comfortable during the research. As the researcher was already present during the lessons leading up to the interviews the children and the researcher got the chance to get to know each other. Furthermore, the researcher has experience with working with children and has received training in this. Finally, the teaching team at the DFF, including the researcher, were and are always open to talk to the children about specific topics when they feel the need to do this, for example after the interview. These three factors likely have contributed to a comfortable and safe environment during the research in which the participating children did not experience any negative feelings and in which they felt free and comfortable to share what they wanted to share.

Results

This section lays out and elaborates on the results from the observations, the interviews, and the group discussion. First, a logbook of the lessons will be provided after which the summarized results from the observations will be discussed in the second paragraph of each lesson’s description. In this logbook a summary of the activities and the general atmosphere during the lessons will be provided. Second, the main outcomes of the interviews with the participating children will be shared. Lastly, the results of the group discussion with the parents will be written out.

Observations

Lesson 1. During the first lesson the theme for the series of lessons was shared, some ground rules were set, and the main goal was to get to know each other. Most explanations of exercises and theoretical lessons were given in the setting shown in Figure 3, with the children sitting on wooden picnic tables and a slide is used to write down important information on.

Figure 3: Children listening to explanation of an exercise (Ising, 2021)

From the start, the ambience was informal and people were chatting and eating together. Some children and facilitators already knew each other from last spring, when some of the children had already participated in the Ecoliteracy program. During the first activity, the rules were discussed together with the children, also reflecting on what they remembered from last time. Some still remembered the permaculture rules (people care, earth care, and fair share), which are being used as guidelines in the lessons. After this a game was played to get to know each other. The final activity was a creative exercise based on the theme for these lessons. During the exercise the children came up with ‘food forest characters’ that could play a role in the story of change.

The general mood during the lesson was good. Everyone seemed to be happy to start and get to know each other. The children behaved well and they excitedly joined each activity. They amply contributed to the thinking up of the rules and most children were exceptionally excited about the creative exercise in which they got to use all kinds of materials to come up with a character. Many out-of-the-box characters were created and they thoroughly thought about their special powers and connections to other characters and their place in the food forest.

Lesson 2. The children were complimented on their good behavior during the lesson before and the rules were repeated. The topic of today is ‘what is change’. During the first activity the children could introduce their character to their peers and connect them to various concepts related to change. Thereafter a game was played in which the concept of evolution was central. The main goal of this lesson was to set up a scientific experiment, in which they could study change in a tree. Every lesson they would now look at that same chosen tree to observe what is happening over time. Finally, they wrote the ‘letter to themselves’, as a part of this study. In the letter they got the chance to reflect on their experiences in the food forest. In the end there was a moment of reflection on what they did and learned today. In Figure 4, some children are working on this assignment while sitting in the grass.

Figure 4: Children working on their 'Letter to themselves' (Ising, 2021)

Overall the lesson was nice, the children participated actively in most exercises and were excited to do so. A remarkable trend was how some children disliked that there were relatively more exercises in which they had to sit down and think and write instead of running around and exploring. This was also voiced by some children during the exercises, in which they were also quite chaotic and in which not everyone contributed equally. Furthermore, during this lesson connection seemed to be experienced on various levels. As an example, one child was meditating next to their chosen tree, and other children expressed to feel like grass when sitting in the forest. Two other themes that could be gathered from the observations are cooperation and creativity. Overall they liked being and working together and they were also thinking quite creatively and free during the exercises.

Lesson 3. During the third lesson there were some additional guests who were visiting as part of a conference on the topic of children and nature. The theme of this lesson was ‘active

human change', and the planned activities were meant to reflect on this theme. The children first got the chance to observe their chosen tree again, as part of the ongoing observational research that was set up last lesson. The main activity was 'the fox's journey'. After being put in a circle and putting on a blindfold, the journey started. The journey entailed an audio story with sounds accompanied by physical sensations, which would together guide the children through various natural (and less natural) contexts. After this there was one last exercise in which the children could practice with scientific proposal development. In small groups they could brainstorm about ways to improve the food forest design, after which they would present their proposal to the other groups.

Overall this lesson was quite chaotic, which can partly be explained by the extra visitors that joined in with some activities and simply the fact that it was more crowded. Activity-wise the children were excited, especially the fox's journey was highly appreciated, also by the visitors who were able to join. Some found it slightly anxiety-inducing, especially while they could not see what was happening. This sometimes led to taking off the blindfold or screaming quite loud, which may have impaired the experience for others. What was also noticeable is how more children start to feel more connection in some sense to the for example the tree they observe every lesson or to the facilitators with which they seem to look for more interaction. Furthermore, something else that stood out was the expression of higher levels of mindfulness in the children. This implicitly came up for example during the reflection on the fox's journey, but also became clear in the way they for example treat each other, the rules, and the food forest. A last observation was about a trend that also became visible in other lessons, namely how the children take all opportunities to think creatively. During the last exercise about food forest design, many came up with very creative ideas and plans to improve the food forest. During the lesson this was sometimes perceived as not taking it seriously by some of the facilitators, however, it was a good exercise in thinking freely and out-of-the-box. Finally, during the lesson there were also some children that did not actively join the activities or who are mean to other children. While this seems to be a trend during the lessons, it is not the behavior of the average child coming to the food forest, however it is important to also mention these outliers.

Lesson 4. This lesson was designed around the topic of the scientific method. When the children came in, one facilitator was already making the fire for this lesson, which excited a lot of children. The lesson started with a reflection of last week. Afterwards, different kinds of questions in science were explained and discussed and the children practiced with this, also thinking of methods to answer the questions. After this, the lesson was mostly practical. Various groups were formed for different activities, and the children could pick what they liked to do best. One group focused on gathering nettles, one group prepared these nettles for rope making. Some children helped the facilitator keeping the fire on. Another group again cut vegetables and gathered herbs from the food forest. Finally, vegetables, herbs, and nettles were being put in a big pot over the fire and a soup was made, from which everyone could taste some. Figure 5 shows the big pot with the soup cooking inside of it.

Figure 5: Soup from vegetables and plants and herbs found in the food forest (own photo)

The children all seemed genuinely interested in the theory about scientific research and as everyone could choose what they wanted to do for the second and practical part of the lesson, they were also happy during those activities. The atmosphere was good overall and the children were participating actively and enthusiastically. More specifically, through the observations it stood out that being able to choose what activity they wanted to do, they were very invested and excited. Furthermore, they were helpful when it was clear that some activity could use some more hands, or when they were so excited they wanted to work and help with various activities. During the scientific exercise they also showed that they are quite knowledgeable, and how they engaged in critical thinking. This critical and creative thinking also came up outside of these exercises, as one girl for example found bones in her parents' garden and took them to ask what kind of bones they could be.

Lesson 5. During this lesson the researcher could not be present, thus no observations were carried out. What follows is an account of the activities and general atmosphere as described by present facilitators.

The lesson started with a reflection on last week's research and the children also got time to observe their tree to see if any changes had happened. Afterwards, the theory of this week was explained in which the concept of 'active change' was central. They thought about the various ways of change and practiced with examples of the concept in smaller groups. They also spent time on more hands-on activities. They made rope from the gathered nettles from last week. They also helped the food forest team by cleaning plastics from the woodchips that were needed for the newly made hill on one side of the food forest. As a final activity, the children got the chance to design houses for hedgehogs to hibernate in. This lesson was described as being quite chaotic and the children did not like and enjoy all activities so much. In the end of the lesson there was also an issue with children throwing mud at each other. The facilitators reported that the children were tired and that many had small quarrels.

Lesson 6. After lunch the children did the weekly observation assignment, about which some insights were shared upon return. Then, the theoretical part of the lesson was introduced, which was about the mycelium network. After shortly discussing the topic, a game was played in which the group acted as a mycelium network, to increase their knowledge and make it more practical and visualized. Afterwards everyone got a cupcake, which one of the facilitators brought as a birthday treat. The remaining time of the lesson was spend on building houses for hedgehogs to hibernate in safely and comfortably. The children had already thought about the design of such houses the lesson before, and this week it was first discussed what would and would not work before they went off and started the construction in small groups. Finally there was a short reflection and everyone sang for the facilitator whose birthday it was.

The atmosphere was a bit tense initially, because of some things that had happened last week as well as at the beginning of this lesson. These things were however pointed out and discussed straight away, and the group seemed to listen and understand what the problem was. Afterwards it got more relaxed again and everyone had new energy to start over and make the best of this week. During the lesson this was also reflected. The facilitators were excited in explaining the theory and leading the exercises. The children were also interested in what was explained and seemed to enjoy the various activities. More specifically, one thing that came up most during this lesson was the importance and the willingness to care for animals, which was sparked by the making of the hedgehog houses. While some ideas were not feasible or maybe also not right, most children were very enthusiastic about this exercise and came up with many ideas on how to protect and feed the animals. Next to the fact that they were helping animals, the children also seemed to be excited to be building something, to develop ideas and create what they thought was best with the available materials.

Lesson 7. This lesson took place at the Wageningen Student Farm (WSF) instead of at the DFF. Together with the team from WSF, the facilitating team prepared a lesson for this excursion. The children seemed quite excited, but also a bit shy and more silent in this new environment. First an introduction to the WSF was given. The goal of this lesson mostly was to discover new places and to see whether the gathered knowledge could also be applied there, and

what new knowledge could be gathered there. Further, there was a focus on changes in fall and differences between the food forest and the student farm. To reach this, four activities were designed between which the children rotated, so that all of them had done every activity in the end. The children participated in the following activities:

- Fix and braid the willow hut
- Learn about and use compost (Figure 6)
- Collecting and spreading seeds
- Edible plant safari: look for plants and harvest them (Figure 7)

Figure 6: The children learning about and working with compost (Ising, 2021)

Figure 7: The children on an 'Edible plant safari' (Ising, 2021)

After these activities, everyone came back together for a plenary reflection session about what each group had learned today. The overall atmosphere was a bit chaotic, but mostly in a good way. Once the children felt more at home and more comfortable, they started running around enthusiastically like usual. Most children seemed to enjoy and actively participate in most activities, yet sometimes some were less engaged.

While observing was a bit more chaotic during this lesson, the following findings can be shared. At the compost station, many children at first were hesitant to touch the compost and to help because of that reason. Some also did not mind and after some time more joined as well. They also tried to guess what they could find in the compost and some children told stories about how they had already used compost before, for example to grow the biggest pumpkin ever in their parents' garden. More generally in the lesson, the groups were not very clear. Children were running around, and with that, although they were trying, not always being so careful of the plants in their enthusiasm. Most children were excited about the activities, and less about the parts in which they had to listen to explanations or theories. Overall many children seemed excited to make and do things, and quite some also took for example seeds or parts of plants home to share what they did and share their knowledge on what could be done with it, for example about what they learned during the edible plant safari. Figure 8 shows some of the children running at the WSF.

Figure 8: Children running around at the Wageningen Student Farm (Ising, 2021)

Lesson 8. Lesson 8 had to be cancelled due to some children catching COVID-19 and the class having to stay home in quarantine. Instead, the teaching team provided the children with some challenges that they could do at home or during a walk. These challenges were:

- To find mushrooms, make a picture and check which ones they found.
- To prepare something for the upcoming festival, make/do something creatively.

While there was some hesitancy about whether the children would like to participate in these challenges or prepare something for the festival, the turnout was surprising. Quite some children sent in pictures of mushrooms, some gave them funny names and some also put other extra effort in.

Lesson 9. During this lesson the researcher was not present in the food forest, as the first part of the interviews was conducted during this lesson. The following is a description of the activities and the general atmosphere as described by other facilitators who shared their insights at the reflection that is being held after each lesson.

At the start of the lesson there was some time for the children to look at their hedgehog homes, to see how they were doing; to see if it needed anything else; and to check whether hedgehogs had already arrived. The rest of the lesson was shaped around a quest that the children had to complete together. The quest was based on a fox that had stolen something. In smaller groups they would go to three stations, where they would have to engage in three different activities. After (successfully) doing this, they would at each station receive a hint. With these three hints they could at the end guess a present they would receive for finishing the quest. The three activities were:

- A tea station: here they talked about their characters: what has changed in the food forest for their character, and they could already think about how the costume for their character was going to look (preparation for the festival).
- An acting station: at this station they created an image of the polyculture around an apple tree. What would their characters do? This was a place where they could play with improvisation-acting.
- A detective station: here they focused on finding out what had happened exactly.

Lesson 10. Lesson 10 was the final lesson of this season and was therefore planned as a ‘festival’: a festive party to end the lessons together in a fun way. During the first part of this lesson the researcher was again not participating in the lesson, in order to conduct the last interviews. During the festival the following activities took place:

- Tree observation: the final tree observation of the season. What happened, how did the tree change, and was it as expected?
- There was a space where they could make their costume.
- They could get their face painted if they wanted.

- They could do various arts and crafts.
- They could play games (e.g. chess).
- There was a campfire, where they could roast marshmallows and heat and drink chocolate milk.
- They could jump the ponds.

The second part of the festival was a talent show, in which the children competed against each other in various categories. Some children performed a song or a dance, some did cabaret, or acted out some scenes. Everyone seemed to be excited to perform and also excited to see their classmates perform and to cheer for them. Baked apple pie and more chocolate milk were also passed around. The acts were creative and humorous and everyone seemed to have a good time.

The atmosphere during the festival was better than it had been during any of the previous lessons. During the first part of the lesson the children were quite free to see where they wanted to go and what they wanted to do in preparation for the second part. This led to small groups practicing acts together, and children making sure their makeup and outfit matched their food forest characters. The children seemed to really appreciate and enjoy this freedom and everyone was running around happily. The atmosphere during the acts was also good, as everyone was clapping and singing along and no one seemed to be judgmental or laughing at others in mean ways.

Summary observations

Based on the observations, most children seemed to enjoy most lessons and activities. The children were especially keen on the activities in which they could either explore the food forest and be relatively free and active or the activities in which they could work on something with their hands and be creative with that. As with any group of children, some liked specific activities more than others, which could sometimes lead to some children acting out or expressing being bored. Overall however, there was a good and relaxed atmosphere during the lessons and there seemed to be mutual respect between the teaching team and the visiting children. In general the children also treated nature in a respectful way, yet sometimes this carefulness was partly lost when they were playing and running around a bit more wildly.

Interviews

The following section will dissect the three themes of doing, being, and relating, thereby focusing on the personal experiences of the children.

Theme 1: Doing. The first theme that became apparent was the one of ‘doing’. Many topics that the children touched upon in the interviews were based on concrete activities. Quite literally even, a topic that was discussed often was how many children appreciated anything connected to doing things. Especially building (e.g. of the hedgehog houses) or making something and gathering or preparing food were the kind of activities that were popular when talking about what they enjoyed most about the lessons. The children also appreciated the variety in activities and they liked that they got the freedom to sometimes choose between activities

based on what they liked better or felt more like doing. Contrarily, it was also often stated how they disliked the opposite of 'doing' or actively engaging with something, for example sitting still for longer times, listening to explanations or presentations, and 'unnecessary' repetition. A quote that accurately demonstrates this tendency is:

> *"I thought we could do some more activities, instead of talking a lot, because we do talk a lot."*[2] (I5)[3]

Some children reflected on how they already disliked these kinds of activities, but how they were perceived to be even more annoying in the setting of the food forest and the Ecoliteracy program. The reason that was given for this was that within this setting the opportunities for alternative and more active ways of doing things was much more present and possible, that it felt like a waste to not use it.

It was also in the more active activities, in the sense of actively doing or engaging with something, that it became clear that their creativity was sparked. In other words, the educational setting and content seemed to foster a kind of creativity in their thinking and doing during activities that allowed for this to be explored. One of the children for example reflected on this while describing on of their favorite activities, namely building a house for a hedgehog to hibernate in:

> *"I really like to build things and I think a bit out-of-the-box, so then really crazy ideas can come out!"* (I4)

It should also be added how some children also already liked creative activities such as drawing and building. These children usually were extra excited when they could combine something that they liked with something that they would have found less interesting without the possibility of visualizing it.

Another topic that came up was the comparison of the Ecoliteracy lessons to their experiences during 'normal' lessons at school in a regular classroom. Two general patterns were that the Ecoliteracy lessons were more focused on 'doing', or active activities, and content-wise more focused on nature, a topic that was not touched upon at school as much. In connection to this focus on 'doing', some children mentioned how it was easier to remember some of the discussed theory when it was connected to an activity. This also became clear from what they said more implicitly, as the things they remembered were mostly remembered in combination with the activity that was done to increase comprehension on the topic. Examples are learning about the importance of taking different perspectives through the fox's journey or the theory on the mycelium network that was visualized through a game that everyone played together. Many children also mentioned how it was less boring when something they had to learn was connected

[2] An overview of the original quotations in Dutch can be found in Appendix F, in order of appearance in this thesis.
[3] The codes following the quotations are made up of I or FG, meaning Interviews or Focus Group, and a number. The numbers represent the different participants.

to actively engaging with it, which the children noticed led to improved concentration and motivation.

It could thus be summarized that what the children were doing, as guided by the lessons, the activities, the facilitators, and the place, seemed to spark at least some enthusiasm about being creative and thinking creatively. Furthermore, the content of the lessons, or the various activities and experiences, seemed to stimulate motivation in the sense that most children were excited about 'doing' or actively engaging in the activities that were planned. Combining all the above into a sentence, one quote summarized the value of actively engaging with content and the meaning of this theme quite adequately. One of the children mentioned how

> *"In school they can maybe teach this to you, but you will never understand it as well."* (I1)

Theme 2: Being. The second theme is mostly about the experience of space and place, or more concretely, about how the children reflected on their own feelings and behavior in connection to the context of nature and the food forest specifically. Overall, the majority of the children were exceptionally positive about receiving education in the context of the food forest. Many positive opinions were shared during the interviews when asked what they thought of the lessons and how they experienced the setting. Something that was mentioned often is that they simply liked it, partly also because it is special and different from where they usually get their lessons. Some children reflected on how they saw being outside in the food forest or broader nature as healthy.

When it comes to reflecting on feelings experienced in the setting of the food forest and during the lessons, the following findings are interesting to mention. Some children noticed that how they felt or their moods during the lessons were not only based on the lesson or the setting, as it was usually originating from the kind of day they had had or what had happened at school for example. Some children however then also continued to explain how coming to the food forest and engaging in the activities also would sometimes change their moods. For example, some children mentioned how they would feel tired or a bit moody before coming, as it was a Friday afternoon or when something less nice had happened in school already. However, they reflected on how being in the food forest and joining the activities would sometimes help them to feel more at ease again, or how they would even become happier and excited even when they were a bit tired before. One interviewee shared this about being tired before but still having to come to the lesson:

> *"Sometimes I still want to go home then, but most times I do like it after some time."* (I6)

Connectedly, it was also mentioned that the food forest is experienced as a place where feelings can be expressed. One of the interviewed children explained, when talking about how they feel in the food forest:

> *"Usually very happy (...) also a bit tired or sad (...), for example when something happened at school. Yes, then I think the food forest is a nice outlet to become a bit happier."* (I5)

Quite some children also reflected on the food forest as a place where they can be themselves and where they feel comfortable. The food forest was more than once described as a calming place, which felt peaceful. Paradoxically, the space was also described as one in which you can have fun, in which you can run around and which feels slightly wild. This is also connected to some children appreciating the context as one in which they experience freedom and a sense of or eagerness to explore. Some children reflected on how the context was really interesting to them, as they could learn a lot from what there was to find. When talking about how the content of the Ecoliteracy classes is different from their regular education, many children said something along the lines of the following quote:

> *"Here they adapted the lessons to nature in such a way that you can look around everywhere (...) and you can explore everywhere, looking, actually you discover yourself what is happening and you cannot do that in a simple classroom."* (I1)

The context thus sparked some kind of appreciation or freedom to explore and learn about what the children themselves find interesting, or maybe some interest that is created through this ability to choose what you want to do. Some children also reflected on how the context also brings them in contact with different or more exciting nature, either because it feels slightly wild or because they can find plants they did not see anywhere else before, as one child shared about a duindoorn, a plant she now knows much more about. Someone also said when reflecting on having a food forest as a classroom how there are:

> *"many new things that you can see and learn, because I by far have not yet seen everything (...) here before."* (I9)

Finally, something that came up almost during every interview when asked what was disliked about getting lessons in a food forest or about the lessons in general, were practical issues. One aspect that was mentioned most was the weather during some of the lessons. As this series of lessons started in September and ended in December, it during some lessons it got quite wet and cold, which the children found uncomfortable. Another aspect that was disliked by some children is connected to the placement of the food forest, as a busy road goes past it quite closely. Towards the end of the lessons however a natural hill was placed between this road and the food forest, potentially improving that aspect. Finally, when asked what they did not like about the lessons, some of the interviewees could not immediately think of something, but after some thinking shared that they disliked most when they could not come to the food forest for the lesson, for example because of the quarantine that the class was in during a lesson.

Theme 3: Relating. A final theme based on the trends found in the interview data, is the one of relating. Looking at relating in the broad sense, this theme will reflect on how the children

described their relationships with other people, be it other children or teachers, with animals, and with nature as a whole.

People. The children reflected quite a bit about their interpersonal experiences during the lessons in the food forest. They also seemed to be quite honest in this, in the sense that they would also talk about how they may have not behaved in the best ways sometimes, and showing remorse or feeling the need to explain themselves. Overall however, most children reflected on their interactions with other students but most of the time also with the teacher in a positive manner. One interviewee for example mentioned how working together overall went fine, how they would try to look at each other's strengths and make sure everyone was included. To illustrate, the following quote comes from one of the children reflecting on working in groups:

> *First, I try to have a look, what does that one think, what can they do well, what do they want, and then I am going to say what I want (…). So usually it goes alright.* (I5)

Concerning the teachers, some children were not much in contact with them, but thought they were nice when they would interact. Others related to them a bit more, and sometimes reflected on personal aspects of teachers that they appreciated. One aspect that came back a few times during the interviews is the one of diversity. Some children talked about how they noticed and appreciated how the various teachers were different from each other and how they felt that it was important to meet and be in contact with different kinds of people. A quote from one interviewee speaking about the group of food forest teachers accurately summarizes this feeling:

> *"You are really very different. That is actually really nice."* (I2)

Finally, some children reflected on how over time they felt more comfortable with the children in the lessons and the teachers in the food forest. In the beginning they sometimes felt a bit shyer, but after some time they felt more connected to the other people and felt comfortable to have fun together.

Animals. The children did not only reflect on how they related to other people, they also more than once reflected on their views on and interactions with animals. The majority of the children mentioned to like animals, some even used the word love. Other children however felt less interest towards them. Those who felt less interest towards them would usually not pay much attention to them when they came across them, or not even notice them. Those who liked them, often also felt to some extent intrigued by them, which would manifest itself in them being eager to study the behavior of the animals they came across in the food forest or outside of that. To illustrate, one of the interviewees shared how they feel happy in nature because

> *"you can see all these animals going about, and what they are doing. I always like that."* (I9)

Within the activities, quite some children mentioned how they liked activities related to animals. Some activities concerned with taking care of animals or taking the perspective of

animals were popular amongst most children. Some children also went further than that and reflected on actively making sure animals were not harmed during the lessons. A few of them shared how they felt concerned with animal wellbeing, and said they were unhappy with how people seemed to ruin the earth for the animals. On a more philosophical level, some children reflected on how people are actually also animals.

Nature. Finally, the children more than once reflected on how they related to nature in their interviews. One of the most occurring findings was how many children already liked nature quite a lot. They appreciated it for its beauty and described it for example as wondrous and special. One quote that illustrates this general tendency is:

> *"I also really like nature, (...) some landscapes are really very beautiful and nature itself is anyways beautiful, (...) you often also have in a leaf, then you can see all these details and that is simply very beautiful."* (I6)

When asking further, some children seemed to have experienced a slight change in the way they related to and behaved in relation to nature. One of the things they mentioned was how they already liked nature before coming to the food forest for the lessons. However what changed was that apart from only liking nature and appreciating it, they also started to find it more interesting as they learned more about it. A quote by one interviewee that is talking about their perception of nature summarizes this tendency quite precisely:

> *"First, I only liked it. And now I like it and I find it interesting."* (I1)

Another thing that had changed was how they treated nature. Overall, quite some children mentioned how over time they were more aware of how they treated nature. This became apparent for example when they would reflect on what they did when they played in nature. Some would say how they used to not notice how they would treat nature and just walk over anything and take branches or parts of trees for example. After learning more about nature, they started to appreciate it more and they started to have more respect for it. A general conclusion could be that many children said something along the lines of or implied that they became more mindful of nature, including plants and animals. They started to notice nature more and they tried to be more careful and respectful towards it. Some children however also honestly admitted that they would sometimes accidentally be slightly less careful when they were playing. In connection to that, some children for example also reflected on how badly people were treating the earth, and how that was a problem not only because it would ruin the earth and big parts of nature and how it would extinct animals, but also because people need the earth to live.

Summary interviews. In short, the majority of the children expressed a positive attitude towards the lessons in the food forest. Furthermore, the children enjoyed active and creative activities the most, in which they could make or build things and think out of the box. Most children shared that they feel good in the food forest and some started to feel more comfortable and relaxed over time. The setting of the food forest is appreciated by the children for various

reasons, amongst which its uniqueness, how it invites to explore and be creative, and how it fosters an understanding of the taught materials in a way that in a regular classroom and with a classic way of teaching would be difficult to achieve. Finally, quite some children reflected on how they related to people, animals, and nature in general. Next to learning more about it, some seemed to have become more aware of the connections between these entities and how their actions have consequences for other people and the natural world as well.

Focus Group

Finally, this section will provide the perspective of the parents on how they experienced their children during and after the lessons at the food forest. What already became clear early on in the interview is how quite some parents or other family members have a background that is related to what is taught in Ecoliteracy. One parent for example has a background in environmental science, another family member is a biologist. The parents reflected on how they would already teach their children from a young age for example about where food came from or about sustainability issues and broader nature-related topics. One parent for example explained:

> *"We do try to teach them something about how nature works and that the food that gets to your plate (…) also comes from nature, and not just from the store."* (FG2)

Some parents also reflected on how they believed because of this their children were already interested in the topics discussed in the lessons. Similarly, when asked about whether for example the permaculture rules were to any extent shared when talking about the lessons, most parents were convinced that this was not quite noteworthy enough as these rules were already internalized by most children. Be it because of how they were raised by their parents who shared their norms and values with them or be it because it is in accordance with their personality so they are not so new or different from what they would otherwise do.

When discussing what the children took home with them from the lessons it mostly seemed to be things that they had done, so concrete activities, which they would then share right after coming home on Friday afternoon. All children of the participating parents would be enthusiastic about the lesson. When children shared information or told stories about topics related to Ecoliteracy, most parents found it difficult to say whether this actually came from the lessons or whether it came from somewhere else. One of the parents for example shared how their child is a

> *"walking fact machine, so when something [that they share] comes from Ecoliteracy or not, that I do not know for sure."* (FG1)

Sometimes the children would be more clear about this, when they were for example reminded of a topic or activity from the lessons, for example by a mushroom or another natural component, and they would share what they remembered from the lesson and that their knowledge came from this specific activity for example. Another moment in which the parents could be certain is when the children would bring things home from the lessons about which they would then talk

and explain. A topic that also seemed to have gotten more attention over the duration of the lesson was feeling concerned for animals and human's part in that. Some parents also noticed that their children were more interested in natural food and where that came from, leading for example to a child that wanted to eat more herbs with dinner and was interested in this. While some changes thus seemed to have become clear to the parents, one of them also added some nuance by saying that although their child would maybe recognize and talk about plants when walking around more often,

> *"It is not as if she walks around outside now very differently or something like that."* (FG2)

Overall however, the parents expressed positive opinions about the Ecoliteracy lessons, and they felt that it was an enrichment to their children's education. They also agreed on the need for this education to be more widespread, so that more children would get the chance to learn about these topics.

Summary focus group discussion. The group discussion with the parents shed a different light on the case, as the conversation mostly focused around the upbringing of the children and how the parents experienced their children and their ideas and thoughts about the lessons outside of those lessons. An important consideration lies in the fact that the Ecoliteracy topics already seem to have been part of the upbringing for all of the participating parents. Further, most parents were careful to attribute slight changes in behavior of their children solely to the Ecoliteracy lessons, as it was unclear for them where these changes came from. Overall however, the parents were happy with the lessons and perceived it as an enrichment of the curriculum.

Summary Results

This paragraph will provide an overview of the most important findings. From the observations, it became clear that overall the children enjoyed the lessons in the food forest. They were especially keen on activities in which they could be creative and/or in which they could use their hands to build or make something. During the interviews, the children themselves also shared that they liked the active parts of the lessons the best. Additionally, they experienced the setting of the food forest as one in which they felt happy and as one that sparked their creativity and a sense to explore nature. They also seemingly felt comfortable and able to be themselves in the food forest and around their classmates and the teaching team. Nature was by the majority of the children described as a special and beautiful place. In the group discussion with the parents they shared how some of the Ecoliteracy topics were already present in the upbringing of the children. Connected to that, they were hesitant to attribute changes that they sensed in their children (solely) to the Ecoliteracy classes, although some suspected that it had changed some things. Finally, all parents were happy with the Ecoliteracy lessons and thought it was important that it would become a standard part of the curriculum.

Discussion

In this section, first the outcomes of the three different employed research methods will be compared to each other, in which similarities between findings as well as differences will be considered. Second, the results will be discussed in light of the research questions, considering the concepts of connection, compassion, creativity, and nature experience. Finally, some further implications will be shared, as well as the strengths and limitations of this research and directions for future research.

Comparison Results

Similarities. A finding that was present in the results of all three methods was the one of the children being most enthusiastic about activities in which they could be active and creative. Be it in the literal way, so activities in which they could run around and explore or in activities in which they could either build something or creatively work on some arts and crafts project. Their great enjoyment of these activities was visible in the observations, in which the children would usually be actively involved during the more active activities, but it also became clear during the interviews with the children themselves and during the conversation with the parents. During the interviews, the children themselves reflected on how they enjoyed it most when they would work with their hands and make something, something that was also often mentioned as being a personal hobby already. During the group conversation the parents discussed how after every lesson the children would mostly excitedly tell about the practical things that they had undertaken during the lesson of that day. One explanation that was given for this by the children was that they simply loved doing it, especially also in comparison to having to listen to theoretical explanations and sit still and be silent. This was also reflected in the fact that the majority of the children seemed to have difficulties with remembering concrete theoretical lessons, and neither did they bring this up much when coming home from the lessons. As mentioned before, not being active and creative felt even less appropriate in the setting of the food forest, as the setting provides so much opportunity to learn with your hands and through doing things instead of simply learning by listening and repeating information. Contrarily, apart from the exact theoretical lessons that were not remembered too well, most children did gain knowledge through the lessons, for example about specific plants and their uses or animals in the food forest. This knowledge was for example gained through having used the information in an exercise or game or by finding a specific plant and asking about it. This was also noticed by the parents, who mentioned how their children would sometimes share information when they would come across specific plants.

Another factor that seemed to come back concerns the behavior of the children. Overall, the children displayed kindness and a sense of acceptance or being at ease and present. This was visible for example during the observations, as children in general were helpful to each other as well as to the teachers when they needed help with something. Also towards animals the children were compassionate. The majority was excited about activities which revolved around animals, for example to take care of them or building them a new home. Some children also seemed quite

protective of animals when coming across them and feeling a need to help them and make sure that others would also be careful of them. During the interviews this appreciation of animals also came back, with some children reflecting on how they love animals and how they like observing and studying them. In the interviews as well as in the group discussion it also became clear how some children are concerned with animal wellbeing and the state of the earth in general. Some expressed deep distress about the way people were treating the earth and the accompanying effects. A similar tendency was noticeable in connection to feelings about nature, of which animals are also part. From the observations as well as in the interviews and the group conversation it became clear how some of the participating children are aware of the current state, and with that the current crisis that the climate is in. Some seem to be more concerned than others and some have also not mentioned it at all. Those who did mention it also seemed to be aware about the human role in the situation.

Differences. Overall the outcomes did not differ much, nothing that was found was truly surprising when compared to the other outcomes. The main difference is the way in which the children and the parents respectively reflected on whether or not certain experiences had induced changes in for example feelings, and behaviors over the course of the lessons and/or due to the followed education. The parents' perspective on this topic was based on what they knew about their children before the lessons had started, considering the way they were raised; their own interests and backgrounds; and the children's prior interests and behavior. The thoughts and feelings shared by the children were based on how they had experienced the lessons, and how they potentially felt and behaved differently at the beginning compared to the end. The parents for example shared how they made sure to implement Ecoliteracy topics in the upbringing, something they found important also partly because some had careers in related topics. They also shared how the rules such as the permaculture rules that are used and repeated quite regularly during the lessons are in general already things that the children had learned at home. Finally, they believe their children had already been interested in many of the Ecoliteracy topics before coming to the food forest. In that sense, the parents were hesitant to attribute changes they had experienced in the behavior of their children solely to the Ecoliteracy lessons, which seems to be valid given their arguments. On the other hand however, quite some children expressed ways in which they believed either their feelings or behavior had changed due to the lessons and the natural context. Children stating that they started to feel more comfortable over time or how they experienced a more mindful interaction with nature than before they came to the food forest seemed to be honest reflections of their experiences. In principle, these two different viewpoints do not have to cancel each other out, as both can be true at the same time. While some parents thought their children's behavior had not changed or maybe not definitely because of the lessons, the children can still experience changes in for example feelings that are not directly observable by parents in other contexts.

Answering the Research Questions

The following paragraphs aim to answer the developed research questions. Concretely, this will be done by elaborating on the concepts of connection, compassion, creativity and on how the children experienced the specific place of the food forest and nature in general. Throughout there will be references to studies on similar topics, to which the outcomes of this study will be compared.

Connection. The concept of connection is built around the experience of different places; acting responsibly; and an openness towards otherness (Pisters et al., 2019). In short it is about interconnectedness of all layers of life (Pisters et al. 2019). Towards the end of the lessons, the children seemed to be experiencing more connection, and being more aware and reflecting more on it. Some children actively reflected on their sense of connection, for example between people and nature; people and animals; or people amongst each other. An example is when some would talk in their interview about how people are also animals, or how people need nature to be able to live. Some children were less explicit about it, yet their behavior seemed to point to the experience of connection.

One of the main changes is that the children seemed to become more aware of their surroundings and the importance of treating those in a proper and respectful way. An overall sentiment was that of how at first most children did not even think about how they treated nature but how that changed over time. Through the experiences they had in the lessons and through learning to appreciate nature more, they started first to be aware of how they were treating it and consequently they reflected on trying to be more careful and kind. Additionally, some children also reflected on how they felt more connected to the other children and the food forest teachers. Whether they had first felt a bit shy or did not know many of them yet, they experienced more openness and personal connection towards the end of the lessons, leading to moments in which they could be themselves and on an equal level with others. Finally, the children seemed to have become aware of differences between different children, and diversity in the teaching team. This for example helped them to see different perspectives and to be aware of the fact that not everyone is and/or has to be or think the same but that there is value in diversity, which can foster connection to others or other entities that are different or not as expected.

Compassion. Building on the previous concept of connection is the concept of compassion, which evolves around being kind and mindful and being engaged with and caring for others (Pisters et al., 2019). It is also connected to a more pro-environmental mindset and the accompanying behavior (Pisters et al., 2019). The explicit topic of climate change did not play a big part in the contents of the lessons, as can be read in the logbook of lessons and activities. Connected topics however, such as the interdependence and –connectivity of various layers of life may have induced thinking processes on the matter. Some children showed awareness of the climate crisis and also seemed to be concerned for the wellbeing of nature and animals specifically. Concrete pro-environmental behavior as a results of these attitudes were not measured in this study. However, most children did reflect on being more mindful about nature,

whereas they were maybe more wild and careless before. This finding is in line with what other studies found on this topic as well, namely that feeling more connected to nature is correlated with more pro-environmental behavior (Mackay & Schmitt, 2019), which was expressed by the children in this study for example by being more aware and having gained an understanding about the importance of treating nature respectful. While only being more aware might not count as pro-environmental behavior, some children also reflected on being more careful with plants and in nature in general, as they tried to not unnecessarily take or break things.

Overall it could also be concluded that the participating children were caring and engaged with others. Some children reflected on how they felt more aware of other people their perspectives after spending more time together, for example when having to work in a group together. This finding thus seems to be in favor of programs that take longer than only one day or afternoon of environmental education, as the majority of the children seemed to become more comfortable, and with that more open to experience and be part of the lessons, over time. Additionally, as Davis (1998) discussed, being emerged in nature has the potential to facilitate a deeper understanding and empathy with it. Over time the children participating in the Ecoliteracy program did learn more about the setting of the food forest and simultaneously also expressed feeling more comfortable there. This finding thus also seems to be in line with other research on this topic.

Creativity. The concept of creativity is mostly defined by finding creative solutions to problems and practically shaping practices in favor of a new and more ecologically conscious situation (Pisters et al., 2019). Being creative was something that the majority of the children enjoyed in the lessons and specific exercises, and those activities that were concerned with actually doing or making something, usually in creative ways, were also the activities that were remembered most. This could be connected to how Wells and Lekies (2016) stated how more practical and place-based versions of environmental education are more likely to have a longer lasting effect on the children. Along those lines, the practical activities are those about which the children were most enthusiastic and which they remembered relatively well, which can potentially be explained by how the memory is more tangible and connected to a space and specific context. Some of them seemed to already be interested in creative and active activities before engaging in the lessons, when their hobbies concerned building or making things, or drawing for example. On top of sparking their creative side, simply by letting them quite free and exploring of how and what they wanted to do in some activities, the lessons seem to have given them an idea of how creative thinking and thinking outside of the box can be valuable when the regular way maybe does not give the desired or necessary outcomes.

Apart from liking the creative activities, the education specifically also seemed to spark their creative sides, especially in comparison to more conventional primary school subjects. This was for example visible in the way in which they were excited about exploring and finding interesting plants in the food forest. Additionally, they often reflected on creative ways to use natural elements that they came across, in exercises as well as in during more free time. An

example is also how during the activity in which they had to build a hedgehog house, the children wanted to use all kinds of random materials in all kinds of ways. The activities in general made it possible for them to think outside of what would usually be possible, as during most exercises the outcomes did not specifically have to be realistic or 'normal'. This became clear for instance in the ways in which they created their food forest characters, in which much fantasy was used to design something unique. Similar outcomes were noted during the food forest design exercise, in which unrealistic but quite creative and fun design changes were proposed.

Perception of nature. The final sub-research question concerned the perception of nature as a result of the program. As can be read in the results, the children reflected on how they experienced nature and the specific context of the food forest quite a bit. Overall the children seemed to like or even love nature, although some were more enthusiastic than others. The food forest as a setting was also valued. In short, the context was appreciated for various reasons, from being a wilder place where a sense of freedom and exploration was sparked to a calming place where emotion could be let out, which is in agreement with earlier research on these topics. McMahan and Estes (2015) for example stated how being in more natural environments can increase positive and decrease negative affect, which is in line with children discussing how they would feel more comfortable in the food forest over time. Furthermore, it is also connected to how children mentioned often how they would feel happy and at peace there, and how also when they felt tired or sad when coming there, they would sometimes feel better after being there for some time. This sentiment is also reflected by what Capaldi and colleagues (2014) stated, namely how feeling connected to nature is linked to being happy.

In general, almost all children already appreciated the simple fact that they were outside and not inside in a classroom. Something that was mentioned often was also how the context is a place that stimulated learning in different ways than a classroom could offer. These findings are in line with what was already known on this topic, as Milbrath (1994, as cited in Liefländer et al., 2013) posited that exactly those direct affective experiences, which come with actually being somewhere, are important to include. Additionally, a novel and natural space as a basis for place-based education and being outside were also determined by Dale and colleagues (2020) also as factors which would lead to more positive student outcomes which was also found in this study. Overall it could thus be argued that the findings of this study concerning experience of place in environmental education are in line with the expected tendencies as presented in literature. Reflections on nature perception were less elaborate, which can potentially be explained by the fact that the food forest was a place where they had been for consecutive visits, and it being more tangible and on top of their minds. However, almost all children shared a positive view on nature, regarding it as special, beautiful, and all natural places as unique.

Further Reflections

Transformative learning. One of the discussion points that also arises from this study is to what extent the children participating in Ecoliteracy education have actually undergone some

sort of transformation, as this is inherently the goal of the (place-based) transformative learning experiences. The question then remains when learning experiences can be considered to be transformative, and not just have some short-lived and shallow effect. Based on the earlier discussed results, it could be supposed that the children increasingly experienced the connection, compassion, and creativity over the course of the lessons. It is however difficult to say to what extent a transformation has happened within them.

To summarize from the employed theoretical framework, according to Mezirow's (e.g. 2003) definition that would mean that the problematic and old frames of references used by the participating children should have changed towards ones that are more open and reflective. According to the one of Pisters and colleagues (2019), that means that within a specific context (place-based) a learning process has happened that has led to a higher ecological consciousness, as becoming apparent through (changes) in the concepts of connection, compassion, and creativity. Based on these definitions, it can be argued that to some extent the participating children have indeed been challenging their predefined perceptions of how things work and what things are important and why.

The definitions of these theories thus provide some guidance. Combining the two, it could be said that through specific learning experiences, that often encompass simple knowledge transference, someone their perspective of something changes for good, leading to them not seeing, doing or feeling the same about something again. When putting it like that, there were certainly some ways in which the Ecoliteracy lessons seem to have influenced the participating children. A clear example is the fox's journey that quite some children mentioned as one of their favorite activities, and it was in general one of the best remembered activities. As explained before, in this activity the children got the chance to go through different settings by using all their senses except their eyes. This made it possible for them to experience natural and more urban settings in ways that they had probably never experienced them before. By relying on smelling and touching, they had to focus on other things than they usually would to find out where they were and what kind of place it was. While this was not the specific focus of this study, it is interesting how this activity that is so inherently different from a regular math's lesson is the one that was remembered so well. It is not impossible to think how this activity that made them perceive reality in a different way is an experience that has changed the way they see or feel about certain things. The overall theme of the lessons may also have contributed to a certain kind of transformation in the children. For instance, an inherently connected activity to this theme that kept coming back every week was the one of tree observations. Throughout the weeks, the children were supposed to reflect on changes within 'their' tree, as they could pick the one they wanted to observe themselves. It became clear after some time that some children started to feel quite connected to their trees, for example through how at the beginning of each lessons some would immediately run to their tree to see how it was doing. Some children also simply liked to sit next to their tree, and one of them liked to meditate close to it. The way in which this arguably quite simple exercise made it possible for them to experience change over

time and connect to a specific part of nature was interesting to see. It is possible that this close-up experience of change and connection to nature is something that they will take with them and that has changed the way they feel about or perceive nature.

In short, it seems that at least some parts of the lessons have been to some extent transforming the ways in which the children experience and perceive things. The experience of the fox's journey and of the tree observations are only two examples, but considering how the children reflected on the lessons and what they had learned and how certain of their ideas and how they saw and experienced how some things had changed, it can be assumed that this was not the only exercise that induced some sort of longer lasting change.

Multiple intelligences. On an educational level, this study implies the worth of experiential and practical learning, which could for example be reached by providing education on site and by using this to deepen the learning experience as happens during the Ecoliteracy classes. This place-based education showed how it is beneficial to be able to directly see and experience the discussed study materials, and in some ways it even encouraged students to explore and be curious to find things about which they wanted to know more. Some sort of intrinsic learning attitude seemed to be sparked in some of the participating children, which was shown in for example the way they were still engaged with the space in moments of exploration and freedom.

Furthermore, given the specific sample of this research, namely highly intelligent and highly sensitive children, it is interesting to see how they responded to this type of education. Education seems to be focused around the concept of one specific type of intelligence mostly. This is for example reflected in the way in which education is still mainly concerned with the cognitive development of its students (e.g. Berger & Pollman, 1996). From primary school onwards, children are categorized in groups according to their intelligence levels. While this obviously has benefits, such as receiving education that is specifically fit to the children their personal needs, it also determines quite quickly already the logical and connected future directions of these children. Considering the results of this study, it became apparent how also children who have a high chance of continuing their education in more theoretical directions, also would benefit from and enjoy more practical and experiential ways of learning. It could be questioned however whether the current normalcy in which children choose, and are expected to choose, their subsequent educational level based mostly on their intelligence levels is something that should remain normal or expected. This study shed a light on how alternative ways of learning and alternative ways of defining the ways of intelligence can be valuable. From a more idealistic perspective, it would be interesting to see how an educational system would be organized when it would be less concerned with only one type of intelligence, and more with the overall capacities and interests of people. This would also include giving them the space to discover this by for example letting them participate in programs such as the Ecoliteracy one. This notion could also be connected to the existence of multiple intelligences, as proposed by Gardner (1983, e.g. as cited by Brualdi Timmins, 1996). This theory shows, next to confirming

the existence, the importance and the value of focusing on not only one type of intelligence but on a more holistic idea of what intelligence can mean to different people.

The importance of this was also reflected in this study. While all participating children are known to be highly intelligent, the majority of them also enjoyed and valued activities that did not have to do with cognitive intelligence immediately. Their excitement during creative exercises and the novelty and ways in which their thinking and creating did not seem to take any rules or existing frames into account can lead to the realization that although these children are highly intelligent, that does not mean they should only use this one kind of intelligence.

Strengths and Limitations

As with any research, when considering the outcomes of this study some strengths and limitations have to be considered. Factors that may have had an influence on this study are the personal interest of the researcher; the turn up of the focus group; and the consequences of the COVID-19 pandemic. Next to these limitations, there are also some strengths of the design and execution of this study, namely how it takes into account different perspectives; how a social desirability bias was countered; and finally how the design allowed for personal meaning and experiences to be shared, leading to added depth on a content and theoretical level. The following paragraphs will elaborate on both these limitations and strengths.

Limitations. First, the researcher's personal interest in the topics of children in combination with environmental education in nature was the starting point of this research. Additionally, reaching 'objective' truths is deemed impossible in studies in which the researcher itself is one of the instruments for conducting the research. While with this research the goal was also not to reach one objective truth, as it is about personal and communal experiences mostly, it is still important to practice research in a transparent and honest way. Therefore it is important to note that a researcher cannot be fully objective, especially considering her personal involvement in this topic, thus the results should be regarded with that in mind. See also the section 'My Role as a Researcher' for an elaboration on this topic. Connected to this is the fact that this research project was carried out by only one researcher. This automatically implies that only one person coded and interpreted the data. This also made the strategy of practicing inter-coder agreement impossible, potentially leading to a lower consistency and validity of the outcomes.

Second, the group discussion with the parents of some of the children was mostly meant to get a different perspective on the learning experiences of the children during the lessons. Especially the questions of whether they shared some of the discussed topics at home or whether their potential behavioral change was also observed by people close to them outside of the lessons could be answered by their parents. However, the group discussion took place with less participants than ideal. This led to a relatively short conversation of about 22 minutes. This could partly be explained by the fact that the parents were quite clear and tot the point in what they wanted to share. Additionally, the parents that did participate agreed on most topics and questions, which led to a heterogeneity in their answers and with that a lack of multiple

perspectives. A slightly bigger group with more diverging opinions and experiences would have been more helpful in order to get a better understanding of the children outside of the lessons.

Finally, the situation concerning the COVID-19 pandemic has also potentially influenced the outcomes of this research. The time in which this research was conducted, namely the fall of 2021, was one in which after some time of improvement in the situation things slowly started to go downwards again. Concretely this meant for this research that the last few lessons could not continue as planned, as the class had to be in quarantine due to a few infections amongst the children. On an administrative level it meant that contact with the teacher and planning with the parents was more difficult, as plans changed during the semester. On a more psychological level, it is also possible that the situation concerning the pandemic has had an influence on the participating children. As stated before, these children are quite sensitive. It is thus not unlikely that the past one and a half years in this situation has taken some toll on their feelings and potentially on their experiences of connection, compassion, and creativity. Additionally, it may have been difficult for the participating children and parents to think back of the lessons, as there was some time between the lessons and the interviews due to the time in quarantine that meant they could not visit the food forest. The 'letter to themselves' may have helped the children a bit to think about the beginning of the lessons and their experiences then.

Strengths. One of the main strengths of this study is the combination of the results from observations, interviews, and a focus group. When comparing the outcomes from the various methods however, it is important to keep in mind how they all provide the description of the case from a different perspective. Comparing observation notes with personal reflections shared in interviews and by views of family members on development is difficult as all methods looked from different points of view and slightly different topics were addressed. Observing children does not lead to knowing what they think about something; asking children this does not have to mean that they are honest or otherwise that they also act in line with what the thoughts and feelings they share; and how a parent experiences their child does not need to be in line with how that same child would interpret that same situation. However, all these perspectives together and the ability to combine and compare them provided this study with a more accurate and rich overall idea of the effects and experiences as a result of the education in the food forest.

Second, within this study it was actively tried to counter a social desirability bias in the participants. Something that may have negatively influenced this is the researcher's participation in the lessons leading up to the interviews, as they were therefore aware of the researcher's connection to the lessons and the food forest. However, this was a choice, as the researcher wanted to make sure the children felt comfortable enough to share what they wanted, and being a familiar face makes that easier, as was also shown in the research, namely by how children felt more comfortable with people who were familiar and more comfortable in the food forest after coming there more often. To further counteract the bias the researcher clearly stated before each interview and before the focus group that everyone should and can be honest about what they feel and think and that everything will only be used in an anonymous manner. It seemed however

that most children and parents did not feel the need to please the researcher, or act in the supposedly desirable manner, as many participants were not afraid to share opinions and ideas both positive and negative about their experiences. Connected to this topic it is also important to consider the voluntary participation in the interviews and the focus group. As some parents and children may have been more likely to participate, this could have skewed the data in a certain direction. This issue may have been less present than expected though, as parents already signed up before the lessons had started so without having formed yet a substantiated opinion about the lessons. Additionally, all children that got permission from their parents to be interviewed actually participated, meaning that in that sense the children did not voluntarily sign up, they were simply selected when they got approved.

Finally, a valuable strength of this research is the focus on personal meaning and experiences, supported by the design that allowed for this. Where a questionnaire would have led to a potentially higher number of participants and easier to interpret results, the combination of various qualitative measures have provided this study with more depth and a richer understanding of the studied phenomena. Content-wise, this meant that it was possible to dive deeper into interesting topics, such as shared feelings and experiences that would come up during the interviews. It also allowed the researcher to be partly emerged in the research context and in that way also be a part of the experiences of the children, leading to a better understanding of what was meant when discussing these experiences later. On a theoretical level, it allowed the researcher to better research the concepts in the theory of PBTL. Through discussing, observing, and experiencing what happened during and outside the Ecoliteracy lessons in the DFF, the meaning and expression of the concepts in this context are better understood and deepened in the sense that the connection of the concepts to the case has become clearer. With that, this study has added to the anchoring of this relatively new theory, by empirically researching this specific local and place-based sustainability initiative and linking it to the theory.

Future Research

Based on the findings of the current study and the discussed implications and limitations, this section will elaborate on some directions for future research. On a practical level, this study could be improved by spending more time on and working on the topic with more researchers. Especially a study with a solid longitudinal design in combination with the opportunities to improve intercoder reliability would make the results stronger and therefore more usable. On a theoretical level, it could be interesting to further and more concretely operationalize the concepts within the theory of PBTL. While the work done by Pisters and colleagues (e.g. 2019) and the additional knowledge gained by the outcomes of this study, further improving the concrete operationalization will make it easier to research the topic and the theory and simultaneously make it easier to compare outcomes across studies. On a societal level, it would be interesting to study the effects of this kind of environmental education in groups with different demographics. This would make it possible to see whether for example socio-economic status, upbringing, and intelligence levels are determining factors in the outcomes, as for

example the backgrounds of the parents may have already played a part in the knowledge and appreciation of the topics before the children went to the Ecoliteracy lessons. It would be interesting, for example, to see whether similar results would be found in a group that initially does not like being in nature or learns about these topics at home. Finally, attention should be focused on how it would be possible to increase the reach of educational programs such as the Ecoliteracy one. Similar research projects to this one could then be carried out in order to keep improving this type of education by studying what the factors are that make it worthwhile and enjoyable for the children as well as for the teachers.

Conclusion

This research aimed to get more insight into (changes in) the psycho-social experiences of children as a result of the Ecoliteracy lessons and to see whether the theoretical framework of PBTL could play a role in discussing that specific case, although it was not tailored to the situation and sample group specifically. Overall it could be said that instances of connection, compassion, and creativity were present in the results and have grown at least partly through the learning experiences of the group of children. The children enjoyed active and creative activities; they increasingly felt at ease and comfortable in the food forest; and were mindful, and became even more mindful, in their relations to other people, animals, and towards nature in general. Furthermore, the participating children also seemed to have become more aware and appreciative of nature, leading to an increased understanding of the importance of treating it with respect. Specifically the natural context of the food forest, and its paradox of enabling wilder adventures and feeling calm and peaceful, was liked by almost all children. Considering the results, this type of environmental education could be a good starting point for rebuilding the relationship between humans and nature, as the building blocks present in the education seem to lead to more informed, aware, and involved people. Whereas it is difficult to say to what extent or how exactly the changes in the children have happened, the lessons did seem to have had an effect on them in various ways. In short, based on the results it can be argued that the practical, holistic, and place-based Ecoliteracy lessons have had a considerable effect on the participating children, and that the theory of PBTL showed to be quite a good fit for analyzing the various aspects of this specific kind of environmental education.

My Role as a Researcher

Finally, I would like to reflect on my role as a researcher within this project. Foremost, as was also already discussed in the proposal, before conducting the research, it is essential to disclose that this project was based on personal interest. After joining a project about the establishment of collaboration between various organizations concerning environmental education and after meeting and getting the chance to interview and talk with people in the field I

knew I wanted to work on this topic some more. From the enthusiasm of these people to their positive mindset and will to help people re-explore their connection to nature, there was a lot that inspired me. In short, the topic and people made me feel hopeful and made me experience the agency to also do something. This is why I worked out this thesis topic in which I looked at one specific instance of environmental education and at its effects from a specific angle. Working on this topic in combination with having been able to practically help to make the education happen meant a lot to me. I, and I believe a lot of people with me, can get quite overwhelmed with everything that is going on around us. You want to do the right thing and help where you can, but you can never solve everything and especially not alone. Writing my thesis on this topic and helping out in the food forest gave and still gives me a sense of meaning and gave me a chance to concretely contribute to a higher goal, namely to connect people to nature and to take care of each other and the earth. Horlings and colleagues (2020) developed a conceptualization of the role of the researcher within place-based sustainability research that I feel fits my personal experience in the Ecoliteracy project that I could be a part of and this thesis that I wrote as a result of it. As can be seen in Figure 9 they use head, heart, hands, and feet to represent different parts of the role of a researcher. This representation is relevant for my role in this current project as well, as I tried to go beyond just doing research with my head. Through my engagement with the material and the help I offered during the Ecoliteracy program I tried to include all aspects of being an embodied researcher during this project. While it may have affected the extent to which this research is executed and analyzed in full objectivity, I believe it is important to be invested in this topic. Not only because for me being involved in a topic is a prerequisite of working on something for quite some time, but also because this broader topic of climate change and environmental awareness and connection are topics that cannot be ignored any more. That does not mean that I did not try to conduct this research in an honest and transparent way. It just means I am aware of the fact that my personal investment and the ways in which I may have approached these topics makes reaching the standard of fully objective research difficult, if that was ever a reachable or even desirable standard for this kind of research.

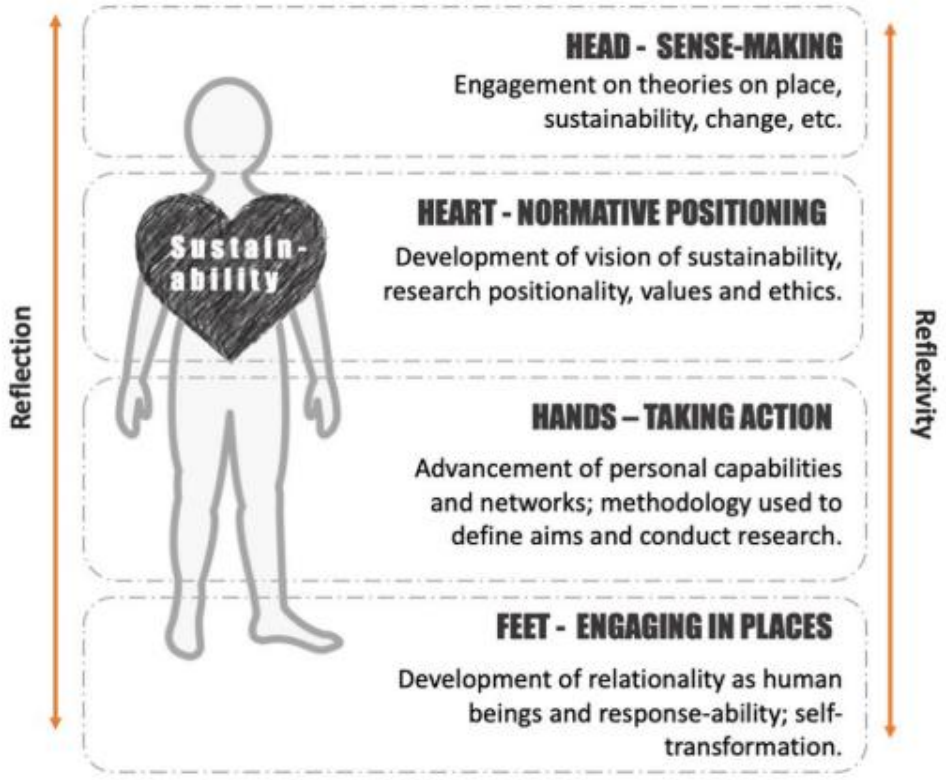

Figure 9: The embodied researcher (Horlings et al., 2020, p. 479).

References

Almers, E., Askerlund, P., & Kjellström, S. (2018). Why forest gardening for children? Swedish forest garden educators' ideas, purposes, and experiences. *Journal of Environmental Education*, *49*(3), 242–259. https://doi.org/10.1080/00958964.2017.1373619.

Askerlund, P., & Almers, E. (2016). Forest gardens – new opportunities for urban children to understand and develop relationships with other organisms. *Urban Forestry and Urban Greening*, *20*, 187–197. https://doi.org/10.1016/j.ufug.2016.08.007.

Berger, E. H., & Pollman, M. J. (1996). Multiple Intelligences: Enabling Diverse Learning. *Early Childhood Education Journal*, *23*(4), 249-53.

Braun, V., Clarke, V., Braun, V., & Clarke, V. (2008). *Using thematic analysis in psychology Using thematic analysis in psychology*. *0887*(2006). https://doi.org/10.1191/1478088706qp063oa.

Brualdi Timmins, A. C. (1996). Multiple intelligences: Gardner's theory. *Practical Assessment, Research, and Evaluation*, *5*(1), 10.

Capaldi A., C. A., Dopko L., R. L., & Zelenski, J. M. (2014). The relationship between nature connectedness and happiness: A meta-analysis. *Frontiers in Psychology*, *5*(AUG), 1–15. https://doi.org/10.3389/fpsyg.2014.00976.

Carter, N., Bryant-lukosius, D., Dicenso, A., & Blythe, J. (2014). *Methods & Meanings*. *41*(5), 545–547. https://doi.org/10.1188/14.ONF.545-547.

Coyne, I., & Carter, B. (2018). Being participatory: Researching with children and young people: Co-constructing knowledge using creative techniques. In *Being Participatory: Researching*

with Children and Young People: Co-constructing Knowledge Using Creative Techniques. https://doi.org/10.1007/978-3-319-71228-4.

Dale, R. G., Powell, R. B., Stern, M. J., & Garst, B. A. (2020). Influence of the natural setting on environmental education outcomes. *Environmental Education Research*, *26*(5), 613–631. https://doi.org/10.1080/13504622.2020.1738346.

Davis, J. (1998). Young children, environmental education and the future. *Education and the environment*, 141-155.

De Prinsenakker. (n.d.). *Eureka onderwijs op de Prinsenakker*. Openbare basisschool De Prinsenakker. https://www.prinsenakker.nl/index.php?section=25&page=218.

Dejonckheere, M., & Vaughn, L. M. (2019). *Semistructured interviewing in primary care research : a balance of relationship and rigour*. *p 1*, 1–8. https://doi.org/10.1136/fmch-2018-000057.

Goleman, D., Bennett, L., & Barlow, Z. (2013, April 18). *Five Ways to Develop "Ecoliteracy".* Greater Good Magazine. https://greatergood.berkeley.edu/article/item/five_ways_to_develop_ecoliteracy.

Groot, E. De, & Veen, E. (2017). *Food Forests : An upcoming phenomenon in the Netherlands*. *33*.

Hammarsten, M., Askerlund, P., Almers, E., Avery, H., & Samuelsson, T. (2019). Developing ecological literacy in a forest garden: children's perspectives. *Journal of Adventure Education and Outdoor Learning*, *19*(3), 227–241.

https://doi.org/10.1080/14729679.2018.1517371.

Horlings, L. G., Nieto-Romero, M., Pisters, S., & Soini, K. (2020). Operationalising transformative sustainability science through place-based research: the role of researchers. *Sustainability Science*, *15*(2), 467–484. https://doi.org/10.1007/s11625-019-00757-x.

Ising, G. (2021). *Front page photograph and figures 2-4, 6-8* [photograph]. Personal communication.

Kesebir, S., & Kesebir, P. (2017). A Growing Disconnection From Nature Is Evident in Cultural Products. *Perspectives on Psychological Science*, *12*(2), 258–269. https://doi.org/10.1177/1745691616662473.

Kitchenham, A. (2008). The Evolution of John Mezirow ' s Transformative. *Journal of Transformative Education*, *6*(2), 104–123.

Liefländer, A. K., Fröhlich, G., Bogner, F. X., & Schultz, P. W. (2013). Promoting connectedness with nature through environmental education. *Environmental Education Research*, *19*(3), 370–384. https://doi.org/10.1080/13504622.2012.697545.

Mackay, C. M. L., & Schmitt, M. T. (2019). Do people who feel connected to nature do more to protect it? A meta-analysis. *Journal of Environmental Psychology*, *65*(December 2018), 101323. https://doi.org/10.1016/j.jenvp.2019.101323.

Masson-Delmotte, V., Zhai, P., Pirani, A., Connors, S. L., Péan, C., Berger, S., Caud, N., Chen, Y., Goldfarb, L., Gomis, M. I., Huang, M., Leitzell, K., Lonnoy, E., Matthews, J. B. R., Maycock, T. K., Waterfield, T., Yelekçi, O., Yu, R., Zhou, B., & (eds.). (2021). IPCC: Climate Change 2021: The Physical Science Basis. *Cambridge University Press. In Press.*,

42. https://www.ipcc.ch/report/ar6/wg1/.

McBride, B. B., Brewer, C. A., Berkowitz, A. R., & Borrie, W. T. (2013). Environmental literacy, ecological literacy, ecoliteracy: What do we mean and how did we get here?. *Ecosphere*, *4*(5), 1-20.

McMahan, E. A., & Estes, D. (2015). The effect of contact with natural environments on positive and negative affect: A meta-analysis. *Journal of Positive Psychology*, *10*(6), 507–519. https://doi.org/10.1080/17439760.2014.994224.

Mezirow, J. (1997). Transformative Learning: Theory to Practice. *New Directions for Adult and Continuing Education*, *1997*(74), 5–12. https://doi.org/10.1002/ace.7401.

Mezirow, J. (2003). Transformative Learning as Discourse. *Journal of Transformative Education*, *1*(1), 58–63. https://doi.org/10.1177/1541344603252172.

Palmer, J. (2002). *Environmental education in the 21st century: Theory, practice, progress and promise*. Routledge.

Pisters, S. R., Vihinen, H., & Figueiredo, E. (2019). Place based transformative learning a framework to explore consciousness in sustainability initiatives. *Emotion, Space and Society*, *32*(September 2018), 100578. https://doi.org/10.1016/j.emospa.2019.04.007.

Pisters, S. R., Vihinen, H., & Figueiredo, E. (2020). Inner change and sustainability initiatives: exploring the narratives from eco-villagers through a place-based transformative learning approach. *Sustainability Science*, *15*(2), 395–409. https://doi.org/10.1007/s11625-019-00775-9.

Pritchard, A., Richardson, M., Sheffield, D., & McEwan, K. (2020). The Relationship Between

Nature Connectedness and Eudaimonic Well-Being: A Meta-analysis. *Journal of Happiness Studies*, *21*(3), 1145–1167. https://doi.org/10.1007/s10902-019-00118-6.

Sollart, K. M., & Vreke, J. (2008). Het faciliteren van natuur- en milieueducatie in het basisonderwijs : NME-ondersteuning in de provincies. *Werkdocument / Wettelijke Onderzoekstaken Natuur & Milieu;102*. http://library.wur.nl/way/bestanden/clc/1873614.pdf.

Stapp, W. B., Bennett, D., Bryan, W., Fulton, J., MacGregor, J., Nowak, P., ... & Wall, R. (1969). The concept of environmental education. *Journal of environmental education*, *1*(1).

Stiglic, N., & Viner, R. M. (2019). Effects of screentime on the health and well-being of children and adolescents: A systematic review of reviews. *BMJ Open*, *9*(1). https://doi.org/10.1136/bmjopen-2018-023191.

Van Neste, P. (n.d.). *Gaining Dutch Children's Ideas for Designing Educational Forest Gardens in the Netherlands* [Unpublished master's thesis]. Wageningen University and Research.

Van Veluw, K. (2020, September 21). *Droevendaal Food Forest* [PowerPoint slides].

Wells, N. M., & Lekies, K. S. (2006). Nature and the life course: Pathways from childhood nature experiences to adult environmentalism. *Children, Youth and Environments*, *16*(1), 1–25.

Appendices

Appendix A: Interview Blueprint

Main research question: To what extent are the activities undertaken in the Ecoliteracy program at the Droevendaal Food Forest facilitating of place-based transformative learning experiences?

Objectives, topics, aspects:

- How do the children perceive the education?
    - Child's perception of education
        - What activities do they remember
        - What do they like
        - What do they dislike
        - Would they choose the education if it was not mandatory
- How do the children perceive the setting of the food forest during the lessons?
    - Child's perception of food forest as setting for education
        - Do they think this setting is appropriate for this education
        - Do they think this setting is valuable for this education
        - How do they feel in the food forest
        - How do they feel during the lessons
        - What do they like about the setting
        - What do they dislike
- Are the children experiencing place-based transformative learning experiences?
    - Experience of (re)connection
        - How do they feel about/treat the natural parts (non-human) of the setting
        - How do they feel about/treat their fellow students during the lessons
        - How do the feel about/treat the facilitators/teachers during the lessons
        - Interdependence(?)
    - Experience of (self)compassion
        - How do they treat themselves/others
        - Are they present during the lessons

- How do they respond to suffering (eg. When someone misuses something or treats someone badly)
- How do they treat nature
- How do they feel about other people/places/perspectives

o Experience of creativity

- What do they like most about the lessons
- What do they think of doing things with hands instead of only thinking with head (as at school)
- What do they think of being in the food forest
- What do they think of interacting with the (non-human) life in the food forest

- Did the children develop an ecological consciousness?

o Development of ecological consciousness

- Do they think different because of the experiences in the food forest
- Do they feel different
- Do they behave different

1. How does the behavior of the children reflect the concepts of (re-)connection, (self-)compassion and creativity?

- How does their behavior reflect connection

o Behavioural expression of connection

- How do they treat the natural parts (non-human) of the setting
- How do they treat their fellow students during the lessons
- How do the treat the facilitators/teachers during the lessons
- Does their behavior reflect a sense of interdependence

- How does their behavior reflect compassion

o Behavioural expression of compassion

- How do they treat themselves/others
- Are they present during the lessons
- How do they respond to suffering
- How do they treat nature

- How does their behavior reflect creativity

    - Behavioural expression of creativity

        - What do they like most about the lessons
        - What do they think of doing things with hands/creating things
        - Does their behavior in the food forest reflect creativity
        - Do they look for creative solutions to problems
        - Do they use their creativity in the exercises

2. How do their cognitions and emotions reflect the concepts of (re-)connection, (self-)compassion, and creativity?

- How do they think about connection

    - Thoughts about connection

        - How do they think about the natural parts (non-human) of the setting
        - How do they think about their fellow students during the lessons
        - How do the think about the facilitators/teachers during the lessons
        - Do they think about the interdependence of things

- How do they feel about connection

    - Feelings about connection/feeling of connection

        - How do they feel about the natural parts (non-human) of the setting
        - How do they feel about their fellow students during the lessons
        - How do the feel about the facilitators/teachers during the lessons
        - Do they feel about the interdependence of things

- How do they think about compassion

    - Thoughts about compassion

        - How do they think about treating others
        - Are they mindfully present during the lessons
        - How do they think about suffering (eg. When someone misuses something or treats someone badly)
        - How do they think nature should be treated
        - How do they think about other people/places/perspectives

- How do they feel about compassion

- Feelings about/of compassion

    - How do they feel about treating others
    - Do they feel they are mindfully present during the lessons
    - How do they feel about suffering (eg. When someone misuses something or treats someone badly)
    - How do they feel nature should be treated
    - How do they feel about other people/places/perspectives

- How do they think about creativity

    - Thoughts about creativity/thinking creatively

        - What do they like most about the lessons
        - What do they think of doing things with hands/creating things
        - Does their thinking/thought processes in the food forest reflect creativity
        - Do they think about creative solutions to problems
        - Do they use their creativity in the exercises

- How do they feel about creativity

    - Feelings about creativity/thinking creatively

        - What do they like most about the lessons
        - How do they feel about of doing things with hands/creating things
        - Do their feelings in the food forest reflect creativity
        - Do they use their creativity in the exercises

3. How do children perceive nature as a result of the program in the food forest?

- How do children perceive nature before the programme

    - Children's perception of nature before the programme

        - Plants
        - Animals
        - Direct surroundings (e.g. food forest)
        - Other settings

- How do children perceive nature after the programme

    - Childrens perception of nature after the programme

        - Plants

    - Animals
    - Direct surroundings (e.g. food forest)
    - Other settings

- How did the programme influence the nature perception

    - Influence of programme on nature perception of children

        - Differences letter and now
        - Memories from lessons about changing perception
        - Experiences that made them reconsider/revalue

- How did the setting of the food forest influence the nature perception

    - Influence of setting on nature perception children

        - Personal connection
        - Memories of activities
        - Learning things place-based

- Did they develop an ecological consciousness

    - Development of ecological consciousness

        - Do they think different because of the experiences in the food forest
        - Do they feel different
        - Do they behave different

Appendix B: Interview Guide

Voor het interview

Neem kinderen apart:

- Vraag of ze mee willen doen aan een onderzoek

Wil jij mij misschien helpen met mijn onderzoek? Ik wil je graag een paar vragen stellen over wat je vindt van de lessen in het voedselbos. Het duurt ongeveer 30 minuutjes, daarna kun je weer mee doen met de les.

- Introductie onderzoek

Zoals je weet ben ik naast een juf in het voedselbos ook een onderzoeker aan de universiteit. Op dit moment doe ik een onderzoek naar wat jullie vinden van de lessen die je hier krijgt en wat je vindt van het voedselbos.

- Informed consent

    - Je hoeft niet mee te doen
    - Je mag alle vragen stellen die je wilt
    - Je hoeft een vraag niet te beantwoorden als je dat niet wilt
    - Je mag ook stoppen als je wilt

- Opnemen

Vind je het goed als ik ons gesprek opneem? Dan hoef ik niet de hele tijd te schrijven als we aan het praten zijn maar dan kan ik wel alle informatie nog een keer terug luisteren voor het onderzoek.

- Privacy

Alles wat je aan mij vertelt blijft tussen ons. In mijn onderzoek ga ik niet jouw naam noemen en ik zorg er ook voor dat mensen jou niet herkennen.

Start interview

Wat vond je van de lessen die je in het voedselbos hebt gevolgd de afgelopen weken?

- Welke activiteiten herinner je je?

    - Wat vond je leuk?
    - Wat vond je niet leuk?

- Wat heb je geleerd?

Wat vind je ervan om les te krijgen op deze plek?

- Wat vind je leuk aan het voedselbos?
- Wat vind je minder leuk?

Zijn de lessen die je hier krijgt anders dan op school?

Zo ja, op wat voor manier?

- Wat vind je ervan om praktisch bezig te zijn / dingen met je handen te doen?

Hoe voel je je in het voedselbos?

Wat vind je van de docenten tijdens de lessen?

Wat vind je van de andere kinderen tijdens de lessen?

- Hoe gaan jullie met elkaar om?

Wat vind je van dieren?

- Wat vind je van de dieren in het voedselbos?
- Hoe ga je om met de dieren hier?

Wat vind je van de natuur

- Hoe vind je het om in de natuur te zijn?
- Wat vind je van de natuur in het voedselbos?
- Hoe ga je met de natuur om?

Hierna: samen terugkijken op brief naar zelf:

Is wat we net besproken hebben anders dan wat hier ingevuld staat? Per vraag doornemen

- Zo voel ik mij hier
- Zo gedraag ik mij hier
- Dit vind ik van de natuur

Appendix C: Letter to Self

Hoi!

Ik ben …

Ik was vorig jaar **ook al** / **nog niet** in het voedselbos

Ik verwacht dat ik dit ga leren deze herfst:

Zo voel ik mij in het voedselbos:

Zo gedraag ik mij in het voedselbos:

Dit vind ik van de natuur:

Groetjes,

...

Appendix D: Letter to Parents Prinsenakker

Titel document: Onderzoek welzijn en het voedselbos

Beste ouder/verzorger,

Uw kind komt sinds kort naar voedselbos Droevendaal voor lessen over ecoliteracy. Mijn naam is Joëlle en ik ben sinds dit jaar deel van het team dat deze lessen voorbereid en geeft aan de kinderen van Eureka 7 en 8 die de komende maanden langs gaan komen. Tegelijkertijd schrijf ik mijn master scriptie aan de Wageningen Universiteit, waarin ik geïnteresseerd ben in de veranderingen in gevoelens, gedachtes, en gedragingen van de kinderen als gevolg van de lessen in het voedselbos.

Voor dit onderzoek zou ik tijdens de lessen het gedrag van de leerlingen in groepsverband graag observeren. Tegen het einde van de lessen zou ik een aantal leerlingen willen interviewen om nog dieper op het vraagstuk in te kunnen gaan. Ik zou het ook interessant vinden een aantal van u te spreken in groepsverband tegen het einde van de lessen om te zien of u veranderingen bij uw kind heeft gezien of ervaren. Concreet zal het onderzoek er ongeveer zo uit zien:

- Gedragsobservatie de komende 9 lessen
- Zelfreflectie door middel van ‘brief aan zichzelf’ geïntegreerd in de lessen
- Diepte interviews met een aantal leerlingen 1-op-1 tegen het einde van de lessen, rond de 15/30 minuten per leerling
- Focusgroep met ouders, rond de 60 minuten

Bij deze mijn vraag om expliciete toestemming om dit onderzoek uit te kunnen voeren. Voor de interviews zullen de kinderen natuurlijk zelf ook gevraagd worden of ze hieraan mee willen doen. De officiële procedure voor ‘informed consent’ zal gevolgd worden. Wanneer u geen toestemming geeft, zal uw kind niet meedoen met het onderzoek.

De eerstvolgende les is op vrijdag 24 september. Het zou fijn zijn als de antwoorden dan binnen zouden zijn zodat het onderzoek gestart kan worden! Wanneer u nog vragen of opmerkingen heeft kunt u mij benaderen via joelle.schokker@wur.nl.

Met vriendelijke groet,

Joëlle Schokker

Scriptie supervisor aan Wageningen Universiteit: Lenneke Vaandrager

Vragen

De antwoorden kunnen omcirkeld worden of de antwoorden kunnen gestuurd worden onder vermelding van naam en vraagnummer.

1. Naam leerling:

2. Ik geef toestemming voor de (anonieme) observatie in groepsverband tijdens de lessen in het voedselbos:

Ja/Nee

3. Ik geef toestemming voor het (anoniem) interviewen van mijn kind, wanneer hij/zij hier zelf ook mee instemt:

Ja/Nee

4. Ik heb mogelijk interesse om mijn bevindingen te delen over de ervaring van mijn kind tegen het einde van de lessen (waarschijnlijk in groepsverband):

Ja/Nee

5. Zo ja, als u uw emailadres en/of telefoonnummer achter laat dan kan ik tegen die tijd contact met u opnemen:

5.a. Naam:
5.b. Email:
5.c. Telefoonnummer:

Appendix E: Focus Group Discussion Guide

Introductie:

- Fijn dat jullie hier zijn
- Mezelf voorstellen

Misschien kunnen we een kort voorstelrondje doen voordat we beginnen zodat we een beetje weten wie iedereen is, ik zal zelf beginnen.

Ik ben Joëlle Schokker en ik zit nu in het tweede jaar van mijn master communicatie en gezondheid aan de wageningen universiteit. Nu ben ik bezig met mijn scriptie, en als deel van mijn onderzoek zijn jullie hier nu ook.

- Vragen of zij zich voorstellen

Uitleg:

- Korte uitleg mijn onderzoek:

Voor mijn onderzoek kijk ik naar het onderwijs dat wordt gegeven in het droevendaal voedselbos, het Ecoliteracy programma. Heel specifiek kijk ik hoe het onderwijs en de omgeving invloed hebben op bepaalde leerprocessen van de kinderen die de lessen volgen. En of deze bijvoorbeeld hun gedrag en gevoelens veranderen. Om tot goede conclusies te kunnen komen doe ik zowel observaties tijdens de lessen, als interviews met sommige kinderen, als dit gesprek nu.

- Uitleg opzet focusgroep en vragen goedkeuring opname:

Deze focusgroep heeft als doel meer inzicht te krijgen in de manier waarop het gedrag van de kinderen eventueel beïnvloed zou zijn door de lessen die zij volgen in het voedselbos. Het idee is dat het meer een discussie is dan een groepsinterview, dus naar aanleiding van de onderwerpen die ik opbreng mogen jullie onderling voornamelijk bespreken hoe je dit bij jouw kind ziet en of deze ervaringen overeenkomen of juist verschillen.

Als jullie het goed vinden dan zou ik dit gesprek graag opnemen. Dit maakt het analyseren later veel makkelijker en dit gesprek ook natuurlijker, omdat ik dan niet mee hoef te schrijven. Jullie ervaringen zullen anoniem blijven en ik zal nooit jullie namen of die van jullie van de kinderen noemen en voornamelijk op groepslevel conclusies trekken.

Onderwerpen te bespreken tijdens de focusgroep:

- Hoe lang komen jullie kinderen al naar Ecoliteracy?

- In hoeverre was natuur(ervaring/informatie) een deel in de opvoeding? (context)
- Wat weten jullie over de lessen?
- Wat noemen de kinderen thuis over de lessen? Als ze vrijdag thuis komen bv
- Noemen ze ook dingen op andere momenten?
- Welke aspecten/ wat delen ze? Welke aspecten komen meest naar voren? Enthousiasme, lessen, regels, activiteiten?
- Zijn er dingen qua gedrag die opvallen / veranderd zijn?
- Interesses/gespreks onderwerpen die anders zijn?
- Hoe verhouden de kinderen zich tot de natuur? Is hierin iets veranderd?
- Wat vinden jullie van dit soort onderwijs?

Appendix F: Translated and Original Quotations

Translated quote (EN)	Original quote (NL)
I thought we could do some more activities, instead of talking a lot, because we do talk a lot.	Al vond ik wel dat we iets meer activiteit moeten doen in plaats van veel praten, want we praten wel heel veel.
I really like to build things and I think a bit out-of-the-box, so then really crazy ideas can come out!	ik hou heel erg van bouwen en ik denk een beetje out of the box dus dat dan komen er hele gekke ideeën uit
In school they can maybe teach this to you, but you will never understand it as well.	op school kunnen ze je dit misschien wel leren maar kun je er niet zoveel van begrijpen
Sometimes I still want to go home then, but most times I do like it after some time.	Soms is het dan nog wel dat ik naar huis wil, maar meestal vind ik het daarna wel leuk
Usually very happy (...) also a bit tired or sad (...), for example when something happened at school. Yes, then I think the food forest is a nice outlet to become a bit happier.	meestal heel vrolijk en zo en ook wel een beetje moe ofzo of verdrietig want het is wel op vrijdagmiddag en verdrietig bijvoorbeeld als er iets op school gebeurd is. Ja, dan vind ik het voedselbos wel een mooie uitgang om iets vrolijker te worden.
Here they adapted the lessons to nature in such a way that you can look around everywhere (...) and you can explore everywhere, looking, actually you discover yourself what is happening and you cannot do that in a simple classroom.	Hier hebben ze de lessen zo aan de natuur hier aangepast dat je echt overal rond kunt kijken en het zou ook gewoon beter zijn omdat … hier die achtergrond is … en je overal kunt ontdekken, kijken, eigenlijk ontdek je zelf wat er gebeurt en dat kan je in een simpel klaslokaal niet.
many new things that you can see and learn, because I by far have not yet seen everything (…) here before.	heel veel dingen en die je dan nieuw kan zien en leren. Want ik heb nog lang niet alles wat hier in staat, ook al eerder gezien.
First, I try to have a look, what does that one think, what can they do well, what do they want, and then I am going to say what I want (…). So usually it goes alright.	eerst probeer ik dan een beetje te kijken, wat vindt die, wat kan die goed, wat wilt die en dan ga ik zelf een beetje zeggen wat ik wil en zo. Dus gaat meestal wel goed
You are really very different. That is actually really nice.	Jullie zijn echt heel erg verschillend. Dat is ook wel heel leuk.
you can see all these animals going about, and what they are doing. I always like that.	dan kan je al die dieren bezig zien. En wat ze dan doen. Dat vind ik altijd wel leuk.
I also really like nature, (...) some landscapes are really very beautiful and nature itself is	Natuur vind ik ook heel leuk om sommige landschappen zijn echt heel mooi en natuur zo

anyways beautiful, (…) you often also have in a leaf, then you can see all these details and that is simply very beautiful.	zelf is sowieso mooi met want je hebt heel vaak ook in een blaadje, dan zie je al die details en dat is gewoon heel mooi.
First, I only liked it. And now I like it and I find it interesting.	Eerst vond ik het alleen leuk en nu vind ik het leuk en interessant
We do try to teach them something about how nature works and that the food that gets to your plate (…) also comes from nature, and not just from the store	we proberen ze toch wel het een en ander mee te geven van hoe de natuur in elkaar zit en dat het eten wat op je bord komt dat dat ja ook vanuit de natuur komt en niet zomaar uit de winkel
walking fact machine, so when something [that they share] comes from Ecoliteracy or not, that I do not know for sure.	wandelende feitjes machines dus wanneer iets uit Ecoliteracy komt of niet, dat weet ik niet zo goed
It is not as if she walks around outside now very differently or something like that.	Maar het is niet zo dat ze nu heel anders buiten rondloopt of zo.