Children's Ideas for Designing Educational Forest Gardens in the Netherlands

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'Tell me and I forget, teach me and I may remember, involve me and I will understand.'
— anonymous proverb

Abstract

Forest gardens are popping up both internationally and in the Netherlands. The purpose of these projects is to combine food production with natural forests. But there is also the possibility to use them as an educational learning space. The point of departure of this study is the development of the educational potentials of those gardens and child participation in design. This research aims to understand children's ideas and experiences of forest gardens and their design. In order to gather valuable qualitative data, twelve children from Food Forest Droevendaal and Food Forest Vlaardingen were asked to share their ideas and experiences. This research combined multiple methods: interviews, slideshow elicitation, walk and talk, focus groups, composite portraits and document analysis which lead to qualitative data, ready for inductive reasoning. In combining those methods, children could express themselves more thoroughly, covering a wide range of themes. Results illustrate that children will design the forest garden with the aim of creating fun spaces, emphasizing that this is where learning happens. Children expressed the desire to have elements that evoke care and wonder, such as animals and food that they can harvest and prepare themselves. They value an open, central space in the garden, as well as lots of water and out-of-sight places. Forest gardens meant for educational purposes should put aside specific learning structures in favor of providing a space that enables children to make connections without feeling obliged to participate. These new relations that a forest garden inspires them to make, allow them to see themselves, their peers, their 'teachers' and the specific relation of food and nature that a forest garden is, in a new way.

Article keywords: forest gardens, children's participation, design, relational learning, multiple methods

Contents

Introduction

In the quest for more nature-inclusive agricultural methods, forest gardens are gaining popularity in the Netherlands. Forest gardening strives to 'copy the structures of a natural forest and succession processes but replaces its non-usable components for (agri-)cultural ones' (Whitefield, 1996) and relies on living (e.g. insects) as well as non-living components (e.g. paths) to thrive. Jacke & Toensmeier (2005) proposed that there are typically seven layers of vegetation that are used in the forest garden: tall trees, low trees, shrubs, herbs, ground covers, vines, and root crops. These vegetation layers are generally accepted amongst professional forest garden designers. The term 'food forest' is used synonymously with forest garden and is used in this research as such. The food forest is usually meant for larger scale projects highlighting the word forest while the forest garden refers to something smaller highlighting the word garden. Either way, this system of food production is challenging current definitions of what farms, nature and community mean, with a few prominent examples leading the way.[1]

At the same time, educational institutions, scholars, researchers and policy makers are emphasizing the importance of a new type of education that puts 'embodied learning' (i.e. involving the whole body to learn) and environmental education at its center. Their goal is to raise a new generation of citizens who can not only challenge current systems but bring about change for sustainable and regenerative living (Code, 2006; Martusewicz et al. 2011; Martínez-Rodríguez et al., 2018). Many of these initiatives strive to improve nature education with their own set of criteria, and there is much knowledge yet to be discovered, such as effective learning strategies in outdoor settings. Their goal is to create 'ambassadors' of the present and future (i.e. people who find it their moral duty to cherish and nurture nature and the outdoors) as natural systems take time to develop and need a holistic interdisciplinary approach for management.

A potentially powerful way to successfully integrate education into forest gardens is by including all stakeholders (e.g. children, policy makers, teachers etc.) as much as possible during the creative process (see for example: Silva et al., 2019). Although this is not the only way, 'collaborative co-creation and interdisciplinary inputs provide an effective space for letting creativity flow' (Rhoten, O'Conner & Hackett, 2009). Out-of-the-box thinking is critical for coming up with designs that fit

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[1] Tuinderij de Voedselketen, Boerderij Buitenverwachting, De Regte Heijden, Voedselbos Emmeloord, Voedselbos Ketelbroek, Voedselbos Schijndel, Voedselbos Het Volmeer, Voedselbos Roggebotstaete, Voedselbos Benthuizen, Voedselbos d'Ekkers, Voedselbos de Overtuin, Voedselbos het Voedselrijk, Eet Meerbosch, Landgoed Peppelhof

the criteria of the place in a sustainable way, because there are no one-size-fits-all solutions to creating forest gardens.

Children in most societies are mainly valued for their potential and what they will grow up to be but are usually devalued in terms of their present ideas and experiences. This view is perpetuated in research where children's ideas are given little attention, and therefore their insights are overlooked. This could also be said about designing spaces and natural areas. However, 'children do develop agency in different settings when given the chance' (Remmerswaal 2008; Kangas et al., 2017), and 'can have a significant impact on decisions'.

By obtaining deeper insights into the forest garden experience of children, it might become possible to attune the garden better to their (educational) needs. While a lot is known about how children experience outdoor learning in natural setting (see for instance, Rios & Brewer, 2014 or Wals, 1994), little is known about how children experience forest gardens, and their ideas of forest gardens, although there might be some similarities.

The knowledge gaps are linked to both understanding children and 'opening up' the children to nature. It is a relational problem where stepping into the minds of children is necessary to figure out how to design a closer connection for them to the world around them (see also: Can & İnalhan, 2017). This research strives to include the voices, ideas and experiences of children into the design process of a forest garden and to set an example for ways that projects of the like can be designed in the future, so that their educational potential can be increased.

Research questions
The aim of this study is to understand children's ideas and experiences of forest gardens and forest garden design in order to implicate them to contribute to more suitable designs and to keep their individuality in mind. Consequently, the aim of this thesis is to investigate the following:

What are children's ideas of forest gardens? *How do they experience forest gardens?*

What is needed to strengthen the educational potential of a forest garden from the child's perspective? *How does the forest garden enhance the relational aspect of outdoor learning?*

How can children's ideas of forest gardens inform their future design and development?

It is important to make the distinction between ideas and experiences. 'Ideas' can be formed before, during or after being in the forest garden and are focused on contributing to the design. 'Experience' is formed during or after and includes the meanings and terms that children give to forest gardens and the terms that they use to describe it. In this sense, meanings and terms are not just cognitive concepts, but rather 'lived' or 'self-made' meanings and terms, that become visible in the actions, attitudes and freedom of children in relation to the forest garden.

Theoretical framework, methodology and methods

Theoretical Framework
In recent decades, several studies have been published about the nature-awareness of children and the benefits of nature education. Remmerswaal (2008), Kangas et al. (2016) and Alderslowe et al.

(2018) all mention the benefits of outdoor learning spaces for children's development. To interpret the results of this research, Marjan Margadant-van Arcken (1990), Hammarsten et al. (2019), Larson et al. (2010), and Wals (1994) have proven to be the most valuable regarding understanding the children's experiences of outdoor spaces.

Different studies have addressed the child-nature relationship and the way children from certain age categories experience outdoor spaces. For instance, Larson et al. (2010) researched eco-affinity, eco-awareness and environmental knowledge in different age groups, and they found that 'children older than eleven years tend to experience nature through social interactions, whereas children younger than eleven seem to experience nature through exploration and direct contact'. They conclude their paper '*I'm too old to go outside*' with the suggestion that 'environmental education may benefit from focusing on building eco-affinity in specifically ten- to thirteen-year-old children'. However, the focus in these studies is the child's experience and the affordances of the place are brought forward less, because not everything is possible in each space.

Norman (1988, 2004) talks about affordances of place and how this influences design. Norman states that there can be both real and perceived affordances within a design, but that the two are not necessarily the same. Furthermore, Norman mentions that there are logical constraints (i.e. reasoning to determine the alternatives) and cultural constraints (i.e. not easily accepted or relatable ideas). Whether a design (for an educational space) is possible depends partly on the perception of the designer, therefore it is important to understand how a space is experienced. Linking back to the children, Can & İnalhan, (2017) talk about child participation in design of educational environments and address the gap of designing with children. They state that 'it is crucial to recognize that understanding children's knowledge, values, experience and use of place would help us improve planning and design of those children's spaces'. Wals (1994) supports this stating that 'it is crucial for environmental educators to elicit and build upon students' perceptions and experiences of nature'. Understanding the children therefore helps understanding the affordance of a place in a design. The gap that this research addresses, is the lack of studies of children's ideas of forest gardens and the children's participation in design of forest gardens specifically. Although much has been written on children's participation (see for example Clark, 2010), the work by Hammarsten et al. (2019) represents the only research found during the literature review of this study that specifically studied children's perspectives in forest gardens. In their paper '*Developing ecological literacy in the forest garden: children's perspectives*', Hammarsten et al. describe interesting focus points of children, to which the results of this research have been mirrored. However, in addition to describing how children experience the forest gardens they know, an important additional dimension of this research is the children's imagined forest garden in their design.

The Dutch book '*Groen Verschiet*' by Marjan Margadant-van Arcken (1990) offers great insights into Dutch children's development between the age of 8-12 in nature education. Since they can read and write, these children are participating in an important part of the social and cultural 'sense-making' of society. However, elementary school children are still predominantly busy with their own 'sense-making' which is based on their personal experiences. Children of these ages are busy with conceptualizing the world as 'personalistic' (e.g. a stranger is judged as either good or bad,

not for their other qualities; materials are judged by what you can do with them and not for the function they were made for) and 'animistic' (i.e. plants, animals, and materials come to life). Margadant-van Arcken brings forward some other affinities that children in this age group have, which will be addressed when discussing the results of the research. Margadant-van Arcken, but also other researchers such as (Russell, 2017), have done research on the influence of animals on children's moral development, stating that animals have a huge impact on the child's experience as they teach empathy and care.

Noddings (2005) suggests that 'the cornerstone of education be the ideals of a caring and relational approach'. Crownover and Jones (2018) build on this with the term relational pedagogy. Relational pedagogy dictates 'a shared relational commitment between all involved'. However, Crownover & Jones (2018) do not consider other living beings beyond humans which was a shortcoming for this research, as more emphasis is put on child-nature relations and outdoor learning in the forest garden. Relational pedagogy ties into the concept of embodied learning, which Stolz (2015) suggests as a possible paradigm shift in the focus of education. Stolz states that what makes embodied learning educationally significant is that the whole person is treated being in connection to a larger whole. Feeling and being connected to more than just humans is exactly what outdoor learning strives to achieve (see for instance: Van der Waal et al. 2012). Askerlund & Almers (2016) talk about outdoor learning in a forest garden versus in a woodland. As has been specified, what distinguishes a forest garden from other types of nature, is the food production aspect, which makes it a socially interesting ecosystem to design (see Nowak et. al, 2012) and which also adds an important layer to the child's experience of the outdoors.

Methodology

Two methodological approaches have become appropriate for this research, namely phenomenology and that of grounded theory (Howell, 2013).

What is studied in this research, is not the forest garden as such, but the by the children subjectively experienced world connected to the forest garden. Phenomenology tries to describe these experiences that are a collection of empirical observations made by the researcher, where the researcher makes a conscious attempt to not distort these experiences by filtering them through a particular lens (Abawi, 2012).

Grounded theory offers an approach of inductive reasoning, wherein qualitative data is first gathered through several modes, as explained below. The lack of scientific research on children's ideas in forest gardens, as previously mentioned, is another reason to use this approach. 'Theories are only formulated towards the end of the research and as a result of observations, once the data reveals patterns and connections' (Goddard & Melville, 2004; Bernard, 2011). In grounded theory, 'the researcher searches for the coding that represent concepts behind the empirically gathered data, and these concepts can then form categories' (Allen, 2013).

The setting

Two food forests took center stage in this research: Food Forest Droevendaal and Food Forest Vlaardingen. While they have some similarities there are also some differences, in terms of their design, size, appearance and in how they connect with schools and children.

Food Forest Droevendaal is in the Eastern part of the Netherlands and is part of the grounds of the University of Wageningen. It is framed as a learning space where university students are invited to do their research and interact with the surrounding community. The Ecoliteracy Program was initiated with the aim of providing school children with a learning space on a weekly basis outside of the classroom walls.

Food Forest Vlaardingen lies in the Western part of the Netherlands close to the city of Rotterdam. Around six years ago, entrepreneurs and local citizens collaborated with Staatsbosbeheer to convert a field of invasive weed species and a public forested area into a semi-public forest garden. Now there are regular activities given by entrepreneurs and volunteers to connect the local community and inspire others to adopt forest gardening with one of the projects being educational workshops for elementary schools.

The children
Two groups of children were contacted: those connected to the Ecoliteracy Program of Food Forest Droevendaal and those who have had forest garden classes in Food Forest Vlaardingen. Both groups of children were familiar with what forest gardening is and offered specific knowledge relevant to the research. The group of children from Droevendaal are in the same class as each other and are participating in a program for highly gifted children, meaning that they are eager for constant educational stimulation. The group from Vlaardingen also all knew each other prior to the research meetings but come from different grade levels and from different schools. As conventional education tends to value cognitive learning more than social-emotional learning and reading, writing, arithmetic and science of the arts and the humanities, it was decided to not differentiate between the children based on their school class's title (namely highly gifted versus 'conventional'). Socio-economically and culturally the children had a similar background in that they mainly were native Dutch (non-immigrant) children coming from middle or upper-middle class families.

Despite the current Covid-19 lockdown crisis and the field work taking place in the summer holidays, twelve children, seven from Droevendaal (two girls and five boys) and five from Vlaardingen (three girls and two boys) participated in the research. The ages of the children ranged between eight to thirteen with eleven being the average age and all children volunteered for this research.

Methods
In this research, the concepts that were extracted from the data, were analyzed by mirroring them with theories that deal with exploratory research on children's connection to nature, as mentioned above. The insights that came out of this research and out of the comparison with other theories, form new knowledge about children's ideas on forest gardens. Following Clark & Moss (2001) and Merewether & Fleet (2014), a range of strategies were used, to allow for a triangulation of data.

The methods used in this research are (in the same order as they were executed): the interview, slideshow elicitation, drawing, and a visually guided tour given by the children, a focus group, and composite portraits. Each method is briefly explained below. The outcome of each of the methods

had the same importance in the results of the research and allowed for each child to express themselves in different ways. As in the study by Russell (2017), 'children were asked for assent'. They could 'end participation at any time and were encouraged to ask the researcher questions or change topics if they felt the need to do so'. All children could choose pseudonyms to keep anonymity for privacy reasons.

The interview sessions were done in individual sessions in the forest garden. The sessions consisted of a semi-structured interview to assess what the child already knew or thought about the forest garden. Certain topics such as environmental knowledge (e.g. species, ecosystem services), the definition of the forest garden, and the most important aspects of a forest garden were structured in a way that children could list what they knew, while questions such as '*What would your own forest garden look like?'*, *'Tell me a something about the forest garden'* and '*Do you like being in the forest garden, and why (not)?*' allowed for more open answers. After the interview, the children were given nine images portraying forest gardens or forest garden designs to comment on (Appendix 1). These were meant to provoke opinions on what could or should be changed about the design. Afterwards, children were given a sheet of paper and a box of coloring pencils with which to design their own forest garden (Appendix 2). To finish up, each of the children was given a GoPro camera and was asked to give a tour through the forest garden (Appendix 3). They could show whatever they wanted and were encouraged to tell anecdotes while walking around. This last method was helpful for understanding their physical experience and what is important to them in the forest garden.

Multiple opportunities for participation and trust-building were key in having a healthy child-researcher relationship. For example, the children could harvest fruits and plants in the forest garden to take home and snack whenever they were hungry. Sometimes it was not clear whether the child had understood the question or assignment. The child might nod in agreement and thereby give the impression of confidence, but in fact the child might not understand at all. Having a parent in the vicinity helped in these instances because they intuitively sensed when their child was not completely on board.

Adult feedback
After data analysis of the children, a focus group was formed with adults connected to the topic, to reflect on the data from the children. The consulted adults represent a range of stakeholders: from teachers, students, and forest garden entrepreneurs; to members of IVN (Institute for Nature Education and Sustainability). The adult stakeholders had some things in common such as an open-minded attitude towards new ways of learning and actively working with and listening to children but were not selected on these criteria. Rather, these adults were selected because they found the research relevant to their own work. When presented with the children's ideas and experiences (Appendix 4), they were given an opportunity to react to them through questions like: *How does this inspire you? How should this inform the design and use of the forest garden, if at all?* Their comments were also considered as data and are used in the results section to add another layer to the children's data.

All four stages and the focus group resulted in audio recordings and some visual content. This totaled to about 2 hours of recordings per child and 4 hours total of recordings of adults.

The researcher

Equally as important as describing the children, is understanding the researcher's position. I know some of these children on a more personal level as part of the Ecoliteracy Program of Food Forest Droevendaal by preparing classes with the team and providing them with digestible take-away messages on diverse subjects. My positioning and participation during these interactions (such as walking along with them during the tour) helped in understanding and contextualizing the importance of my research findings.

I do not have a pedagogical background, rather a background in agronomy, ecology and food systems which eventually became an emergent theme within my coding and analysis. My lack of a pedagogical background, in hindsight, revealed a bias, towards cognitive-analytical aspects of the data (i.e. data that applies human-like intelligence to certain tasks), possibly neglecting important pedagogical-didactical and socio-emotional aspects. Initially, this bias also shaped the way I framed the children's ideas and experiences. For example, I did not spend time asking if they had a favorite tree or how they felt about nature. In the end, by taking time to recognize which things I prioritize, versus what is being said by the children led me to take a step back from my bias and allowed me to see the children through a whole new lens.

Data analysis

The interview material, the slideshow elicitation, the visually guided tour, and the audio recordings during the drawing session were prepared for analysis by transcribing every audio recording verbatim. The drawings were not dissected for their qualities such as color and chronological order of items drawn but were referenced to when the audio recordings were not clear. Likewise, the video-recordings were not dissected for their qualities such as duration of focus on an item or topic, but rather as an indicator of important locations visited with the forest garden. Patton's content analysis (2002) was used as an analysis method, which is 'any qualitative data reduction and sense-making effort that takes a volume of qualitative material'. The analysis of the transcripts was inductive and followed the principles of qualitive content analysis. During the process of analysis these data were categorized in Excel and read through several times in order to obtain a clear overview. During the process of 'open coding' (Elo & Kyngäs, 2008), columns in the Excel sheet 'were coded with names or concepts describing the content of the data' (e.g. cooking). In the next phase, *categorization,* 'similarities and differences in the codes were classified, and in this interpretation process, some categories gradually emerged from the data' (e.g. activities) (Sjöblom & Svens, 2019). Weights were given to the codes based on tallying to produce a hierarchy (e.g. cooking was mentioned eight times, and fishing two times). Codes were revisited to determine the underlying values and ethics that they represented (e.g. the campfire means being together). Eventually, *themes* were formed from these categories.

The next step was using each child's transcripts to compose composite portraits (Willis, 2019) of the children, representing an archetype figure. Each composite portrait is the condensation of each child's transcripts and bears the genders of that group. Later, 3–5 transcripts are condensed into one composite portrait. One advantage of doing this is that by 'providing contextualized and personalized accounts, they can help to build an understanding of particular people and groups, in ways that are accessible to non-academic audiences' (Willis, 2019). The children were contacted

once again and asked to pick one archetype that they identified with the most. The majority of the children picked the archetype to which they were grouped in, pointing at some coherency in the groupings but not completely. These are in no way meant to be comprehensive for developmental psychology of children's thoughts or to generalize children's unique forest garden experiences, but rather serve as archetypes for painting a picture of the research.

Significant statements from the children in direct relevance to paragraphs are highlighted as quotes. The quotes used in the results section are from the individual children and not from the composite portraits, as they are useful for highlighting specific and individual points made in the text. The quantitative analysis is descriptive only and does not consider the possible clustering of content within children.

Results

In presenting the results, the categories are illustrated by quotes and drawings by the children and by lists in tables. As the views and conceptions of the children did overlap in different phases of the research, the 'frequencies of children belonging to the categories are not presented' (Sjöblom & Svens, 2019). The distinction between cognitive-analytical data and the underlying values of that data is made in the tables when thought opportune.

The forest garden according to the children

In interpreting the results and the information given by the children, the first research question was to know what a forest garden is, and what it means to them. According to the children a forest garden consists of water, trees, plants, animals, food. Their definition includes other elements as well, but to a lesser extent; a vegetable garden, humans, bushes and a play forest. Water had a special focus for without bodies of water, a forest garden would no longer be a 'forest garden' by their definition. This is also the case for the boundaries of a forest garden, such as the meadows, as they see it as more than just the forested area. Also, it must always be accessible for (wild) animals.

During the interview, the children identified several purposes that the forest garden serves. In order of importance, the purpose of the forest garden is to learn from it, to be present in it, and to help in it. In other words, *knowledge, being together, experiencing and caring* are the underlying values found in their definition.

Regarding the difference between a vegetable garden and a forest garden the children mostly agreed that the forest garden teaches more about nature than a vegetable garden does. However, it does not show everything (e.g. tomatoes), making a lack in some species another thing that separates a vegetable garden from a forest garden. A vegetable garden can, however, also be part of a forest garden but not backwards. As far as labor goes, the forest garden as an entity provides time for just being outside and for observation whereas a vegetable garden demands more handwork. The forest garden was also seen as a collective responsibility of the whole place, whereas in the vegetable garden, there is a lot more work done by an individual who is focused on a limited amount of plants.

According to the children, the forest garden is also a suitable setting for education. It is a space with many learning opportunities where whole subjects, such as geography and math, can be taught

as well as unique one-off lessons such as making nettle soup. The advantage of having class here is being in a peaceful setting for a few hours a week. Many of the activities identified involving playing with other children and running around.

Design

The second question to answer is how these children would design a forest garden and what ideas they provide that influence the development of the design. The children spent a good half hour, each, drawing their designs for their very own forest garden (Figure 1). They could draw whatever and however they wanted with the one condition that they also took the educational aspect of a forest garden into account. Eleven of the twelve children produced a drawing (Appendix 2). However, some children were not keen on the idea of drawing and preferred to give their design ideas through the other collection methods as one child points out:

Figure 1: Bella's forest garden design

> Bo, 11: I always find it difficult to draw on command. It just comes, so in the beginning I am a bit like…yeah.

To assess whether the overall design is successful, the children give the following explanation: when you are being present in the forest garden, it should provide a 'forestry feeling' and a 'small school feeling', though they were unable to precisely describe these feelings in words.

Plants, vegetation layers and animals

In total, the children named 66 plant species by their common names (Table 1). 34 species were mentioned in the designs and the rest were mentioned exclusively on the tour and/or during the interviews.

Each child named eight plants on average. Fourteen plant groupings were also identified such as 'flowers' and 'grass'.

Table 1: Most common plant species, vegetation layers

#	Plant species	Vegetation layers	Plant groupings
1	Apple tree	Tall trees	Grass
2	Pear tree	Trees	Trees
3	Willow	Bushes	Nuts
4	Nettles	Vegetables	Plants
5	Hogweed	Plants	Bushes
6	Pumpkin	Herbs	Berries
7	Grapes	Grass	Flowers
8	Brambles	Water plants	Vegetables
9	Tomatoes	Climbers	Weeds
10	Walnut	Tree edge	Thorns

An interesting observation is that children neither see nor use the all the vegetation layers of Jacke & Toensmeier (2005) in their designs, even after being shown two images depicting this distinction during the slideshow elicitation (Figure 2).

Furthermore, most children could not name plants by heart. Instead, many plants used in the design were selected by looking around their seat and pointing at the species they recognized or indirectly by telling anecdotes of growing or harvesting their own food.

Friemel, 10: Yeah, we planted winter rye, looked for critters and also roasted bread and ate pumpkins.

Pablo: What is in your orchard?
Hendrik, 10: yeah, a bit like here.

When it comes to animals, the children referred to 53 species, the majority of which were mentioned during the interview, seventeen in the design and a few during the tour. Table 2 provides a list of the 20 most popular animals mentioned, while each child named six animals on average.
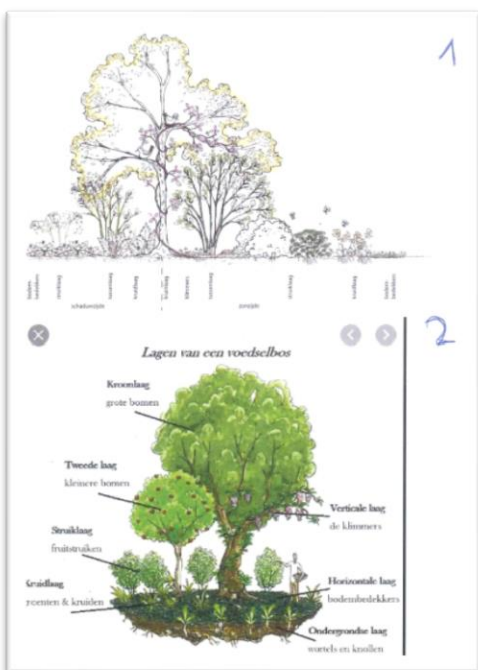
Figure 2: Different images of the vegetation layers of the forest garden shown to the children during the slideshow elicitation.

Table 2: Most popular animals

#	Animals
1	chickens
2	bees
3	fox
4	ants
5	wasp
6	earwig
7	butterfly
8	birds
9	spiders
10	flies
11	rabbits
12	horse
13	frogs
14	king fisher
15	fish
16	cow
17	hares
18	lady bugs
19	salamanders
20	pigs

Chickens and other domesticated animals were quite popular (Figure 3). Some children said that chickens could be included in the forest garden but must learn to survive on their own because they are not actually suitable for the forest garden. Other farm animals, such as cows, were deemed impractical for the proper functioning of the forest garden. Furthermore, one adult from the focus group mentioned that if there were still live chickens present then chickens would probably have been even more present in the designs. On the other hand, wild animals that are commonly seen in a forest garden make up most of the list.

Sometimes the children discovered the importance of learning about living organisms to highlight their intrinsic value:

Pablo: What do you think the intentions are with a forest garden for kids?
Thor, 11: Mostly that kids get interested in nature, that they learn a lot from nature, and that they also learn that here you hear crickets, and those are not pests, but actually living creatures that also have a job in the ecosystem.

Jimmy summed up how children in this study felt about the inclusion of animals:

Jimmy, 9: Yes, quite a lot! I just like being in nature and in a place where animals are. All animals are my favorite animal.
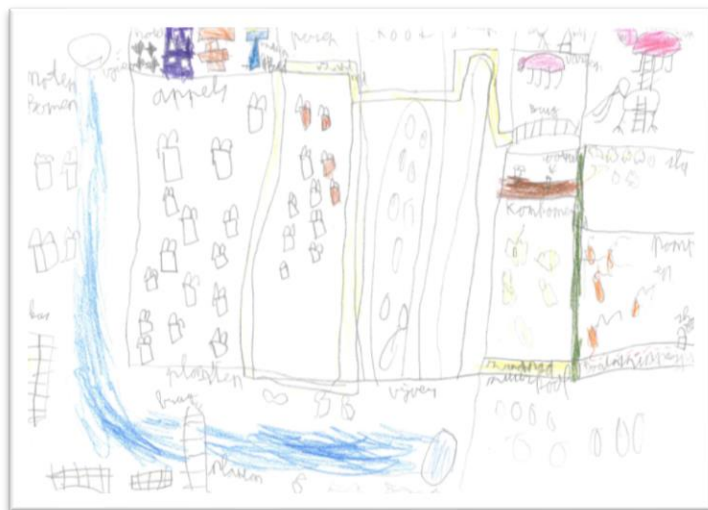
Figure 3: This child's design included bridges, water, different plant sections and a chicken and pig climbing element in the top right corner.

At this age, some children are also being confronted with their own eating habits and how it relates to animals (Margadant-van Arcken, 1990). Five children indicated that they are vegetarian out of respect for the animals, and one went so far as to include his views in his design:

Mees, 11: In the beginning I did not eat pork and stuff or chicken drumsticks but now I think why would you want to eat meat? I would love to go vegan unless I had chickens of my own and those eggs and honey from bees [...] Where does the wind come from? It is handy to know for putting bees in [the design].

These children are spontaneously busy with making collections and categories, and this is also true in their word choice, making language crucial in this process. Categorizing demands that children have a certain capacity for abstraction. Collective names and terms are more abstract than the names of specific components that fall under a collection or term. It is precisely this more abstract level that children have a hard time with (Margadant-van Arcken, 1990). When asked what a forest garden should look like, Kathelijn simply gave three categories of plants:

Kathelijn, 11: Just with flowers and plants and trees

Another abstraction is made by Jacob when asked what animals there are in a forest garden, to which he struggled to find an easy way to summarize:

Jacob, 11: ants, rabbits, insects, flies…umm…

A final example is how one child was asked what the forest garden does. Jimmy gave a very swift and confident answer:

Jimmy, 9: And yeah, the plants also make sure, they make sure that the CO2 is taken out of the ground and trees, yeah, that is a little bit of an ecosystem, but more for a human, that exactly trees are cut down for paper.

Here lies a problem with categorizing, language and association. It could be argued that all flowers are (part of the) plants, that ants and flies are insects, and that CO2 is taken up, not taken out. However, these are problems found also with adults where scientific understanding versus daily language can mean vastly different things. Not everyone is aware of these differences. Fitting exactly what Margadant-van Arcken (1990) explains, the children came up with many of their own categories and collections, which helped them communicate what they felt was the truth.

Appreciation of place

The children also identified the place they were adamant about in the forest garden. Table 3 shows the most popular places the children *indirectly* talked about during all four stages of data collection. Table 4 is a list of the top five most popular spots *explicitly* indicated by children, including the underlying values of that place. Table 4 reflects which spaces in the forest garden the children value the most, with the central space being their favorite location for meeting and being together. The absence of any mentions of the educational potential reflects their preference to simply be there and have fun

Table 4: Favorite places implicitly mentioned by the children.

#	Implicit places
1	Pond
2	Bridge
3	Paths
4	Entrance
5	Campfire
6	Veggie garden
7	Insect hotel
8	Toilet
9	Ditch
10	Chicken coop

It came as a surprise to some of the focus group participants that the campfire was not of higher priority on the list. Their reasoning for this being, that these are things that children do not get to experience very often, and so it should be a unique experience to the forest garden as something exciting and adventurous.

Table 3: Favorite places explicitly mentioned by the children and their underlying values.

#	Explicit places	Values
1	The central space	Meeting, being together, sharing
2	The water and ditch	Playing, exploration
3	Just being there	Being, peace, mindfulness
4	The vegetable garden	Doing, caring, personal growth
5	The play forest	Playing, being together, imagination

The children mainly chose places based on past experiences in groups that they have had in the forest garden, as opposed to places where they did something completely alone. For some, doing an activity resulted in finding beauty and a sense of belonging. Fudge, for example, found this feeling of belonging in the vegetable garden:

Fudge, 13: I think that the first time, or right when we had something new or… for example the vegetable garden, that that was that happiness that made me feel like yeah this is actually such a beautiful place, and yeah, I could be here more often.

How the forest garden offers the children a space to develop their autonomy is reflected in the following quote:

Dora, 11: Behind that first hill, we sat there once when we, yeah, we were just chatting with a few girls, and that became a bit of our place.

Elements and constructions

The most popular elements and constructions from the children's point of view are listed below in Table 5, in order of importance. The way children formulated their sentences and their manner of speaking gave away the underlying values connected to these elements and constructions.

Table 5: A list of the most frequent elements and constructions included in the children's designs followed by their underlying values.

#	Elements & Constructions	Values
1	Entrance	Excitement, formality, wonder
2	Vegetable garden	Care
3	Pond	Wonder, exploration
4	Paths	Certainty, clarity
5	Central open space	Being together
6	Bridge	Adventurous
7	Water	Wonder, feeling encircled
8	Zones: animal, forested, orchard, food production, education, welcoming	Clarity, diversity, functionality
9	Outdoor classroom	Novelty, peace, stillness
10	Tables and benches	Practicality
11	Chicken coop	Practicality, excitement
12	Greenhouse	Practicality
13	Hedge	Natural, protection, clarity
14	Beehive	Care, interaction
15	Climbing tree	Adventure, bravery, growing
16	Edible plants	Food, exploration, literacy
17	Lake	Wonder, openness
18	Water plants	Food, wonder, beauty
19	Flowers	Beauty, comfort
20	Tipi hut	Wonder, privacy, imagination

The entrance, the vegetable garden, the pond, the paths and the bridge were high up on the list of what they thought was important, as also seen in their designs (Figure 3).

The 'entrance' stands out as top of the list and seemed to be very important to the children as it needs to make a lasting impression on the visitors. Some children drew isolated buildings meant for education.

It became clear from the slideshow elicitation that children prefer natural elements (wood chips paths, hedges) over hard ones such as paved paths and fences, which the adult focus group, too, appreciates to be favorable for children. Likewise, the adult focus group also felt that hard elements (stones and fences) take away from the feeling of freedom, and it is therefore understandable why the children do not like them.

However of course, as is the nature of a child's imagination, not everything envisioned was realistic. There was a lot of fantasy and creativity involved in their ideas (Table 6), which the focus group was enthusiastic about.

Activities and games

Activities were also identified, alongside the places and elements in the design (Table 7). The 'doing' types of activities far outweighed the 'learning', 'thinking', 'observing' and 'being' oriented activities.

Table 6: Creative elements not often found in forest garden designs

Creative elements
Medieval house
Chicken and Pig climbing rack
4-star Hotel
Shared animal and human rain shelter
1 ha Veggie Garden 1 ha Forest Garden
Alternating tree species for disease
Island in the lake
A clean pond and dirty pond connected by a wooden deck
Entrance made of woven branches
Repeated zones to split up groups
Tipi-hut
Museum

Table 7: A list of the most popular activities identified in the design and during the visual tour.

#	Design	Visual Tour
1	Harvest food	Cooking
2	Watch/observe/explore	Harvest/picking/eating
3	Play games	Campfire
4	Meet at the central space	Playing games
5	Build/make/cook things	Building huts
6	Join a tour	Planting plants
7	Have class	Be at the central space

These distinctions between types of activities were made by the children themselves. Most activities mentioned were to be held with close friends as opposed to in larger groups. A lot of the activities and games gave off a feeling of togetherness, emphasizing 'we' over 'I'. The focus group mentioned that children learn a lot in the forest garden when they are in smaller groups (of around four) with a facilitating adult, and that children should be invited in with the idea that something is possible, without forcing them to do anything.

Management and wisdom

When asked about which things support the forest garden and how it should be managed, the children were clear: a forest garden should be able to develop on its own. Nonetheless, they do provide details for the design and its management in Table 8, and base some of their design details and drawings on their previous experiences and insights (Table 9). They state that plants such as giant hogweed, and animals like the oak processionary caterpillar must be dealt with caution but could still be a part of the forest garden.

Bo, 11: No oak trees, so no oak processionary caterpillars, I prefer safety.

Table 8: Some examples of design details made up by the children during all four stages of data collection.

Examples of design details
Only rabbits can pass through the gates, not chickens
All the neighbors are farmers
Create a 'small school feeling'
Mix grains with tree strips
39 euros/night in the forest garden hotel
Swimming ponds are lined with grass
No fruit trees around benches
The gate is meant to really excite visitors
Nut trees are randomly planted whereas fruit trees always get a rational spot
Tree selection based on bird preference
Horse trails with three different sized horses to pick fruit along the way

Regarding management, the children mostly agree that visitors are free to do as they like but are advised to ask confirmation (e.g. eat a new plant) and in some cases permission (e.g. climb a tree) for certain things. When the forest garden gets full, people must be prepared to leave so that it does not get overcrowded. In some designs, 'site managers' walk around offering explanations about the forest garden, giving advice on where to find edible plants and will help harvest and process food. There are no artificial fences (i.e. metal, brick) around the forest gardens as a rule for management, as many animals live in the hedges (Table 9). Although a lot is permissible, there are a few things prohibited such as the use of pesticides, littering and vandalism.

Table 9: Examples of insights and knowledge that the children learned about while being in the forest garden.

Examples of insights
Bridges are all slippery
Lots of animals in the hedges
Buildings are not the forest garden
Forest gardens grow mainly on water
Mushrooms grow on standing trees
The locations of amphibians, bird's nests and vanilla scented flowers
The central space and the pond are the hottest spaces in the food forest
There is a secret girl's corner
Autistic brother would not like it here

Mees, 11: no throwing away stuff under penalty of learning why it is bad.

Composite portraits

When analyzing the results of the children's data, the question arises: *what are salient commonalities and differences between the children?* While there are unique perspectives to be found that should not be dismissed as irrelevant, there are certain perspectives groups of children seem to share. By clustering ideas children had in common, so-called composite portraits were created. A composite portrait is a fictional character created to represent the ideas that non-fictional characters share and when portrayed properly, in which these non-fictional characters can recognize themselves. Three of such portraits were created: The Mycelial Kid, the Groundskeeper and the Campfire Cook. Although any potential different groupings of composites would have been valuable, the final groupings were chosen as such because they seemed to best convey the range of positions and views that the data revealed.

The Mycelial Kid

The Mycelial Kid approaches nature as a true systems-thinker. This child celebrates diversity and welcomes new ideas and gives them space to grow. The Mycelial Kid is open-minded, trusting of others and non-judgmental. He has a wide range of interests from playing together, to going on adventures, to connecting to animals. This child is knowledgeable on activities going on in the forest garden. She insists on doing things together but can keep herself busy when alone. He is a supportive and complementary figure when working with others. For the Mycelial Kid, education is not the focus in the forest garden; having fun and being together is the focus. With a simple down to earth attitude, she can listen attentively to what others are saying. His most frequently used words of choice include layers, polycultures, (non-)edible plants, festivals, rewilding and connection.

Mycelial Kid Bella, 11: I would not plant a forest garden for myself because then you have to do all that and then you must keep a big piece of land on your own or something. So, I would rather plant a forest garden with multiple people.

Mycelial Kid Guus, 8: [kids] should just bob their feet in the water and with a fishing net be able to catch the Three-spined stickleback.

The Groundskeeper

The Groundskeeper is a (com)passionate child. He recognizes that humans are a part of nature but not superior to it and refers to climate change and natural processes. The Groundskeeper feels the need to tend to both the living and non-living elements of a forest garden, though she pays special attention to animals. Being surrounded by living things is a real motivator for the Groundskeeper who wants to protect the existing diversity. He is an analytical thinker who puts what people are saying into perspective. She can be very strict and protective over the natural world and would rather have justice served for those who do not respect plants and animals than to tolerate destruction. On the other hand, when given the freedom he will bring in new ideas from the outside and honors having space for new experiments. The Groundskeeper does not feel the rush to learn, but instead insists that by helping each other with the things we do, we learn. Messages like 'grow your own food', 'nature does the work' and 'use natural materials' are common things to hear from the Groundskeeper.

Groundskeeper Bo, 11 (about riding horses in the forest garden): maybe they can choose what kind of horse they want. […] three kinds, a very big one, a middle one, and a small one. […] And if they are good riders then they can maybe go without supervision.

Groundskeeper Jimmy, 9: I do not really like the greenhouse, but it is handy because it… what I do not like about it is you can also just plant with the seasons and yeah sometimes you just like to put something else here and that's fine but then I would make the greenhouse a bit smaller.

The Campfire Cook

The Campfire Cook is a rational and sensitive thinker. She enjoys sharing and interacting with others, is supportive of people telling their story and wants to create a safe space for all. He is very fond of the people close to him, such as family and friends and refers to cherished memories with them for his inspiration. To her, all technologies and ideas should be welcomed, and she constantly brings in creativity from many sources. He believes that everything in nature has a function and can be divided into zones and sections and often makes a distinction between humans and nature. In her eyes, the forest garden is cultivating new thinkers and she sees all activities there as an investment in the future. However, he also makes a point that nobody should be forced to partake in the forest garden activities if it does not suit them, and if they do, then it is because fun and exciting activities are taking place.

Campfire Cook Kathelijn, 11: Some people do not like this place such as my brother. […] No, he is autistic.

Campfire Cook Thor, 11: There would for example be little robot wagons driving around that would do research […] the little wagons would research how good the plants are doing. […] I could teach kids to program them.

Discussion and Conclusion

In this chapter of this paper, the results described above will be discussed to arrive at conclusions and recommendations concerning the three research questions formulated in the introduction. To begin with, the findings related to children's ideas of forest gardens will be summarized and compared to existing literature mainly from Margadant-van Arcken (1990) and Hammarsten et al. (2019). Next, it will be discussed what is needed to strengthen the educational potential from the children's perspective with a focus on enhancing the relational aspect of outdoor learning in a forest garden. Finally, the question will be answered how the findings about children's perspectives can inform the design of future forest gardens, given the potential constraints as described by the affordances of place concept, and recommendations will be made for further research in the final chapter.

Children of ages between eight and twelve are busy with sense-making. 'The children come up with bizarre ideas by using any means at their disposal, making connections and associating things that normally are not associated with each other' (Margadant-van Arcken, 1990). These associations are also influenced by their experiences and what they find interesting. What children are exposed to is important, as they will use these memories to create things and to make sense of the world.

Another point worth mentioning is that the children choose elements by 'copy-pasting' things that they have seen before, or that they remember from previous activities. There are about 80 fully grown apple trees in Food Forest Droevendaal, and the apple trees at Food Forest Vlaardingen

were also very visible to the children during the design phase. This explains why 'apple tree' is one of the most frequent plants on the list. Furthermore, chickens are on the top of the list in Table 2, since Food Forest Droevendaal had had chickens in the past and the children were quite fond of them. Children from both existing forest gardens have had some lessons and games featuring wasps and other insects, which may explain the high frequency of mentions. One could ask themselves, then, if the list of plants and animals would have been different with a group of children who have never been to a forest garden before.

Furthermore, children's statements can at times be contradictory. There were some differences in results from the interviews and the drawings regarding their values in forest gardens. Orally, some children stated the importance of education in the forest garden, whereas they had difficulties bringing this forward in their drawings. Sometimes, the children came up with unconventional elements for this sort of place, stemming from their own minds and imaginations, such as a museum to put their findings on display.

One must assume that 'copy-pasting' naturally plays a role, as the kids experience of the forest garden is of course a big part of what constitutes their idea of what a forest garden is. There is nothing wrong with that, as copy-pasted items also reflect what children value in a forest garden, such as the central open space, bodies of water, a vegetable garden and the animals. The aspect of the children's sense-making and associations, and how even seemingly bizarre ideas may be merged into the actual affordance of the available space, will be elaborated on below (under affordances of place).

How the findings can inform designs of future forest gardens

Children see the forest garden as part of a larger landscape of fun places and will design the forest garden with the aim of creating fun spaces with many opportunities, of which being together is their top priority. Looking back at the data, the children ranked activities like 'looking around' and 'harvesting' high up on the list. Wals (1994) found that in some cases 'nature forms the background, as opposed to the center' of interaction, while the results in this research do suggest that children find typical 'forest garden activities' important. 'Following classes' was low on their priority list of things to do in the forest garden. However, in the interview the children did identify 'learning from it' as the main purpose of a forest garden. It is also important to recognize that there might be too much emphasis put on 'designing for learning' as was the case in this research.

Learning facts and gaining knowledge is not their main interest or focus. While listing the plants, the children chose those that were 'fun', which seems to hint at their usefulness, danger and name; such as the willow which is used to swing on, stinging nettles which are actually edible or hogweed which in Dutch loosely translates to 'bear's claw'. The fact that hogweed is high up on the list in Table 1 might be due to its fame for being dangerous, which clearly left an impression on them. Hammarsten et al. (2019) and Wals (1994) also mentioned a dimension of fear of things in nature as being noteworthy to children.

When children's ideas about forest gardens would be included in the design of forest gardens meant for education, 'education' should not be considered in the classical sense. Wals (1994) adds

to this, saying 'by emphasizing nature as a place to learn in a purely analytical sense, students may become turned off to nature'.

When the goal is for children to learn about forest gardens specifically, another point of discussion is whether the elements the children propose in the forest garden do in fact belong in a forest garden, such as a vegetable garden. In the results, the vegetable garden was very popular and appeared to be something more tangible to the children, which is why it was included so often in the design. The 'doing' aspect and the quick results of a vegetable garden are very important and it has been shown that children quickly become attached to these gardens (Blair, 2009). Becker (2015) goes so far as to say that in a vegetable garden, 'children see segregated parcels and this feeling of wonder is something that they like – the care and wonder for something in its formation'. This feeling of care and wonder that the vegetable garden evokes could be brought into the forest garden in other ways, for example by integrating more plants that the children can easily harvest and take care of, such as berry bushes, or even perennial vegetables. Hammarsten et. al (2019) reveals the most valued places in a forest garden (plants, pond, fireplace and tipi) are similar to the children's choices in this research. This provides promising insights for future studies and designs.

The topic of animals is more problematic. Several food forest farmers such as Wouter van Eck have a strong opinion against keeping domesticated animals, because they easily disturb the balance of the ecosystem. However, in this study the children showed a strong preference for them and favor them above plants. From a pedagogical viewpoint, 'there is much research on the presence of animals as important figures in children's development in education' (Russell, 2017). It may not be a coincidence that domesticated animals are easier to connect to and are used as metaphors for wanting a connection to the natural world, which is perhaps why they frequent the list. Perhaps in this sense, children would be great partners to have when looking at how to incorporate interspecies interactions as they explicitly indicate what animals excite them.

Furthermore, the children did not refer to the different vegetation layers of a forest garden, even though they learned about it in the slideshow elicitation. This, however, might not be a characteristic that can be compromised on, as forest gardens need a minimum number of ecological elements to function (Whitefield, 1996; Jacke & Toensmeier, 2005) so a tension between priority over food production and educational purposes arises. The definition of a forest garden is relatively new, especially in children's education. It should first be shown more frequently through imagery, storytelling or in real life before they form an image in their minds. The forest garden might even go unseen, even when they are physically present in it. In the perception of the child, the category of the forest garden has less strict boundaries than for adults, but this does not take away the added benefits for society and for education, namely the ecologically complex system and the food production aspect (Nowak et. al, 2012).

In summary, a forest garden design that is based on the ideas of children, specifically the children of this research, would include plants that are exciting, such as hogweed, but also plants that are easy for them to care for and to harvest. Furthermore, the children at this age get excited about animals and can inform on which species are most attractive to interact with. The children prioritize having fun above learning, but this is not necessarily how other stakeholders would rank these

values, so in each specific design, a balance which combines having fun and learning should be found.

Relational learning and the educational potential

'Most modern educational systems tend to favor abstract thinking and the development of math and language skills' (Alderslowe et al., 2018). A forest garden could provide a setting for a different kind of learning, one that is more focused on relationality. In simple terms, 'relational pedagogy is the systematic construction of appropriate relationships embedded within the schooling process' (Crownover & Jones, 2018). Learning in terms of relationality is about boundary crossing and seeing relations amongst things, with the notion being that we are all part of one big ecosystem (Alderslowe et al., 2018). When children learn to recognize this and act like this in terms of reciprocity, respect and understanding of place, then one can speak of relational learning and connectedness to nature, which is important to induce 'environmental behavior' (Otto & Pensini, 2017).

Crownover & Jones (2018) say that 'the acquisition of knowledge happens in relation to others', and these relations could be recognized through embodied learning. Embodied learning (Stolz, 2015) is a practical way of teaching relationality to children because it enhances the entire educational experience for children, making learning practical and alive. It can help them learn that they are an individual, and at the same time part of a community of human and non-human beings, connecting them to themselves, their teachers, their peers, non-human beings and the environment around them in a holistic way and therefore it is important to create spaces where this is possible. The results showed children get excited about harvesting and cooking, as it involves being together, making memories and learning new skills. The social aspect of learning in a forest garden also came up several times in the results, and the forest garden provides the children with a different social set-up and more space and freedom to get to know each other and learn from each other. Hammarsten et al. (2019) also note the spread of practical, emotional and abstract skills and learning to co-exist that children acquired while being in the forest garden. The forest garden is a part of this, but there are other spaces that serve the same function as well[2].

A forest garden does not only allow children to have fun, but also to 'feel a sense of belonging to a whole; experience self-regulation and systemic dependence; experience that they co-create together with non-human organisms; and imagine possible transformations of local places', as stated by Almers et al. (2018). Especially the 'spaces and places of children's interspecies encounters are important' (Russell, 2017). Russell continues, saying that 'their experiences with animals and nature take place within a variety of locations and sociocultural contexts, ranging from the classroom to the internet, to nearby green spaces, parking lots' and even the forest garden. Hammarsten et al. (2019) equally brought forward the benefits of spending time in the forest garden and more generally in nature. What distinguishes forest gardens from woodlands, for example, is that a human is a vital component for the health and maintenance of the forest garden

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[2] Books like '*Outdoor Classrooms*' by Janet Millington and Carolyn Nuttall, places like the 'Farmer school' (Remmerswaal, 2008), and organizations such as Springzaad (natural playground network) provide endless wisdom and opportunities to make use of these spaces and offer explicit examples of how to work with children.

and it constantly opens opportunities to connect to each other and to other organisms (Askerlund & Almers, 2016). The food system found within the forest garden allows for even more connections to be made. Furthermore, a design is never really finished, but rather also being shaped by time, for things are added and taken away (e.g. sometimes a tree dies, sometimes a nest is built and should not be disturbed). All this gives the forest garden a reflexive character where participation is the focus. Therefore, to strengthen the forest garden as a relational space, connections between the children and the forest garden as such and amongst the children themselves should be, according to the children, the focus of education in forest gardens. It is through these connections and relation-building that they learn. Forest gardens should, then, be designed to facilitate this connection-making and self-exploration.

Kangas et al. (2016) state that 'when developing pedagogy that supports learning across formal and informal learning environments, it is essential to enable pupils to take different kinds of initiatives and to exercise their agency in versatile contexts'. So, an ideal situation would be one where children are free to visit and participate in the activities going on but are not obligated to do anything specific. In Table 2, 'watch, observe and explore' is the second most important activity according to the children, which suggests a low level of obligation. The focus group had already mentioned that children should be invited in with the idea that something is possible in the forest garden, without forcing them to do anything. However, Alderslowe, et al. (2018) point out that 'simply being outside is not enough to create sensitivity, awareness and learning about the natural world. For this, positive adult role models are necessary, that can authentically demonstrate respect, awe and personal connection to nature through their own example and can also encourage and support children to do so'. This means that the forest garden should be designed to allow for all different kinds of relations to be made through both activities and self-exploration, as this is how children want to learn.

In short, the aspect of how the children will spend time in the forest garden should be consciously 'designed' to allow for the freedom of children to develop their relationality (i.e. do not bombard them with learning goals and predefined activities) and discover their place in the ecosystem. Furthermore, facilitators should recognize their important position as role models.

Affordances of place

The concept of 'affordances of place' (i.e. what a place can provide) (Norman, 1988, 2004) may provide the right mindset for assessing what the potential design of the forest garden could be. For example, in Table 8 one girl put horses into the forest garden that could be ridden around to pick fruit along the way. A logical constraint might be that a forest garden might not provide the proper habitat for the horses, or the other way around, the horses might not add to the sustainability of the forest garden meaning that the forest garden alone as a place would not afford having this function. A cultural constraint may also be that livestock is seen as destructive rather than productive within the forest gardening scene, or that not including livestock into the design might result in less interested children. Other examples children give (e.g. the museum or hotel) show there is great value to be found in the 'illogical' ideas of the children, as this shows that they are unbiased. Since they are still busy with their own sense-making, this means that they are not 'limited' in their thinking by having strong, predefined categories and concepts with which to work. When listening to them with an open mind, ideas that may sound fantastical or unpractical can become great

inspiration. For example, including a museum might seem like taking up a lot of space and resources. But one can also try to go back to the children's idea behind the word 'museum' which is the idea to display what they did and experienced and arrive at something very logical and valuable.

This argumentation shows that even the most far-off ideas the children bring up should not be dismissed too easily, but should be considered with an open mind to identify the ideas and values behind them, which can often be translated into creative and practical considerations that can be made to fit into what the place affords, while also allowing the children to feel included. Therefore, it is important to identify what affordances a place has to offer, given its logical and cultural constraints, and to evaluate in which form children's ideas can be integrated into these specific boundaries of a space.

Conclusions and suggestions for further research

This research aimed to understand children's ideas on forest gardens and forest garden design with the intention of creating an educational learning space. The twelve children designing their ideal forest garden and the methodological analysis of their comments and discussions lead to important observations such as a different definition of the forest garden, creative design ideas, and a tension between the different goals of forest gardens. The use of multiple methods allowed the children to express themselves more thoroughly, which led to nuanced answers.

If projects are set up with the aim of creating a 'learning space', it is important to start from children's own natural eagerness to learn. Children relate to the environment of the forest garden not in terms of the educational aims that adults impose on them, but in terms of having fun, and interacting with each other, with the living creatures in the garden and with the food that is harvested. With the insights of children, forest gardens meant for educational purposes should put aside the specific learning structures in favor of providing a space that enables children to make connections without feeling obliged to follow any predetermined program. These new relations that a forest garden inspires them to make allow them to see themselves, their peers, their 'teachers' and the specific relation of food and nature that a forest garden represents, in a new way. Regarding connections to the forest garden itself, children expressed the desire to have elements that evoke care and wonder, such as animals and food that they can harvest and prepare themselves. They value an open, central space in the garden, as well as lots of water and out-of-sight places.

This approach provides new insight into outdoor learning. Clark (2010) argues that 'there is a still a need for more participatory research about children's outdoor environments' and more specifically on how forest gardens can play a role in the development of these spaces. Future studies could include a more detailed account of the socio-cultural context of the children, a focus on less-privileged children, children who have never heard of a forest garden before, children within different age categories and a long-term follow-up of the same children to evaluate whether their time in the forest gardens may have contributed to pro-environmental lifestyles and active engagement in forest gardens in the long run.

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Appendix

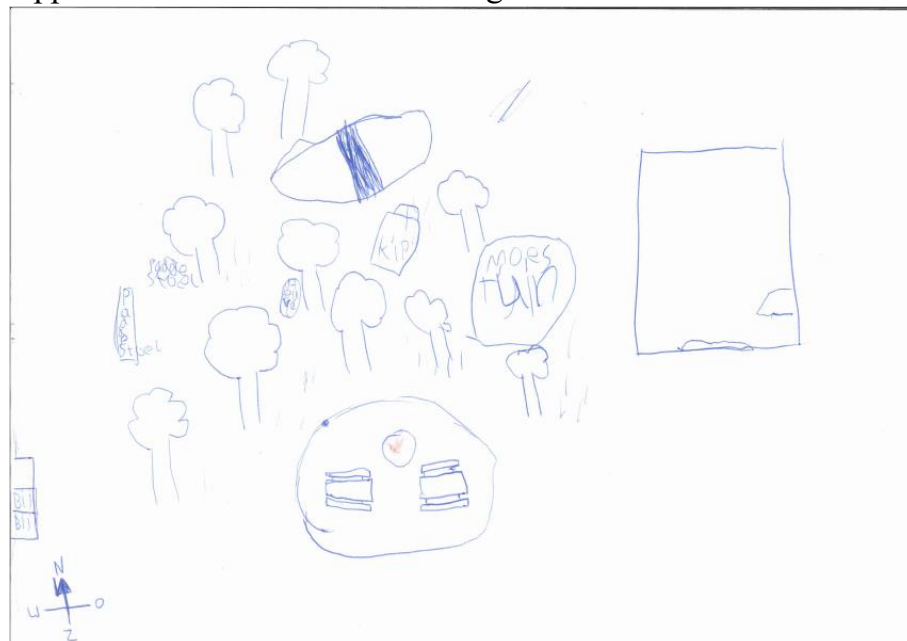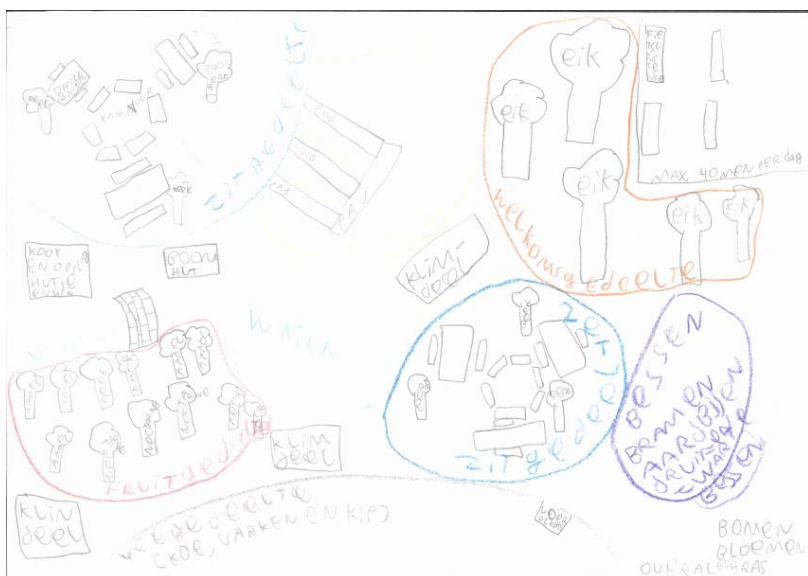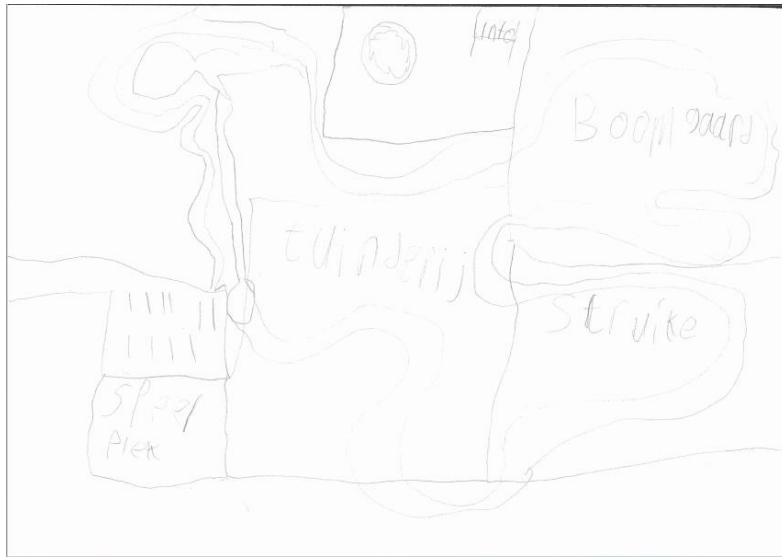Appendix 1 The images used for the slideshow elicitation

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VOEDSELBOS ASSENDELFT
JAN' 2014

N
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VOLKSTUIN ORCHARD

PLAYGROUND

VOLKSTUIN

PLUKTUIN

EDUCATION CENTER

VEGETABLE GARDEN

RYE FIELD

PLANT BREEDING FIELD

COMMUNITY ORCHARD

FOOD FOREST
- Fruit Trees
- Nut Trees
- Berry Bushes
- Nitrogen Fixing Trees and Bushes
- Ground Cover
- Herbs

0   50mt.
1cm = 13,4mt.
10-15mt.

= WINDBREAK

= 3-5mt. DITK CLEARANCE

www.towardsnature.net

7

8

VIEW FROM TOP OF
COMMUNITY GREENHOUSE

Appendix 2 The children's drawings

noten bomen

kleinen planten

fruit bomen

Verschillende soorten planten

bomen plaats

eik · eik · eik · eik · eik · eik

MAX. 40 MAN PER dag

welkomsgedeelte

klim-deel

zitje deel

zitje deel

BESSEN

BOMEN AARDBEIEN FRUITBOMEN BESSEN

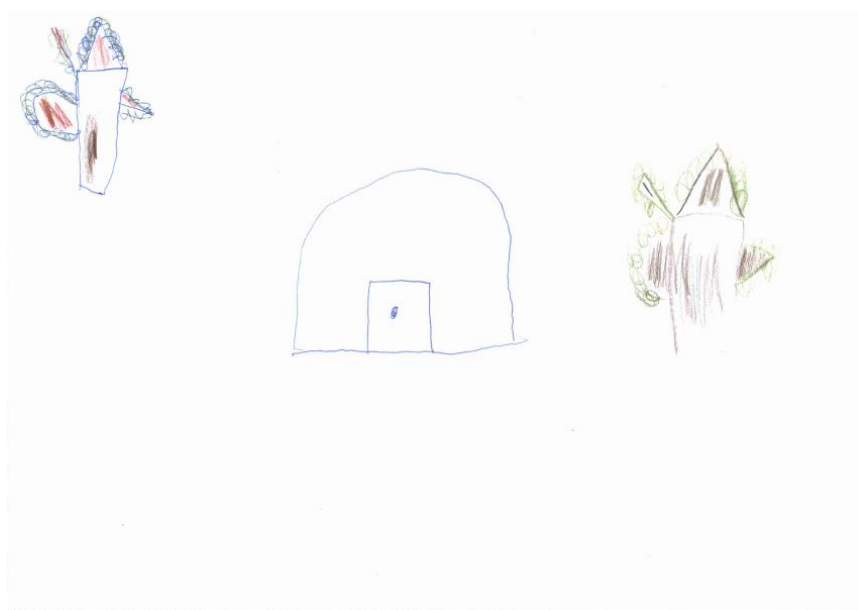FRUITGED

KLIM DEEL

KLIM DEEL

VEEGEDEELTE (KOE, VARKEN EN KIP)
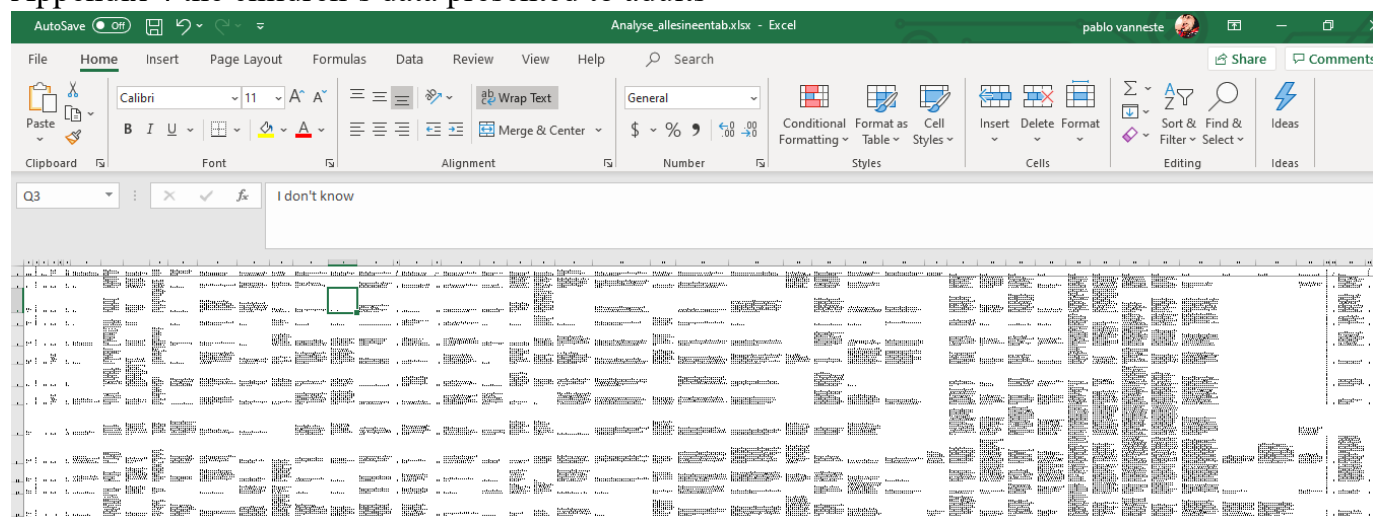
BOMEN BLOEMEN

OVERAL GRAS

Appendix 3 The walk and talk video's

This image is typical for what the children would show me during the walk and talk, using the GoPro.

Appendix 4 the children's data presented to adults

The data on this excel sheet was summarized into 55 PowerPoint slides. Therefore, is too long to add to this document.