

2.º CICLO

EDUCAÇÃO ALIMENTAR

“Hor(t)a H” – For a healthy and sustainable diet

Ema Melim

M

2024



“Hor(t)a H” - Para uma alimentação saudável e sustentável

“Hor(t)a H” - For a healthy and sustainable diet

Ema Margarida Gonçalves Melim

Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto

Mestrado em Educação Alimentar

Prof.^a Isabela Cicaroni Ottoni, FCNAUP

Projeto de candidatura ao grau de Mestre em Educação Alimentar apresentado à Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto e à Faculdade de Psicologia e de Ciências da Educação da Universidade do Porto.

2024

Acknowledgements

To Professor Isabela Ottoni, for agreeing to go on this journey with me and being helpful and supportive in every step of the way.

To Professor Sofia Castanheira Pais, for the precious guidance and expertise and for being ever so kind.

To Professors Pedro Graça and Bela Franchini, for bringing their best everyday and for their love of Food and Nutrition Education, which brought me here.

To my sister, Ana Clara, for being patient with and supporting me throughout these past two years, even in my more troubled times.

To my parents, Carmo and Vasco, who have always allowed me to dream bigger and pursue my wildest dreams.

To everyone involved in the designing of this project, at the Maia municipality and the school: I will be forever thankful for your support, inputs and open-arms.

Resumo

Com o crescimento da população a residir em zonas urbanas, e com os gastos no ambiente que isso implica, as escolas têm um papel fundamental na promoção de hábitos alimentares que sejam não só saudáveis como também sustentáveis ambientalmente. Esta reflexão sobre como a escola pode servir como veículo para a Educação Alimentar levou ao tema das hortas escolares, que são uma boa ferramenta para envolver as crianças e toda a comunidade escolar na produção dos alimentos, na conscientização para as questões ambientais e na promoção de uma alimentação saudável.

Este projeto tem como objetivo promover a integração de hortas em meio escolar através do *garden-based learning*, utilizando-as como ferramenta de educação alimentar, aliando as questões da saúde e do ambiente e fomentando o contacto com a natureza em centros urbanos.

O desenvolvimento deste projeto teve como base uma Memória Descritiva, que contou com várias etapas: a) um primeiro capítulo com revisão bibliográfica de temas relacionados com alimentação, sustentabilidade e educação; b) um segundo capítulo com revisão bibliográfica sobre metodologia qualitativa, respetiva recolha e análise de dados, e ética; e c) um terceiro capítulo com a contextualização do contexto, assim como a análise das entrevistas semi-estruturadas a docentes de uma escola de 1º ciclo da Área Metropolitana do Porto e da dinâmica de grupo focal com estudantes dessa mesma escola.

Os resultados dessa análise e da pesquisa bibliográfica originaram na proposta do projeto “Hor(t)a H”, que visa também a adaptação a outros contextos de outras escolas, incentivando a horta como ferramenta de Educação Alimentar.

Palavras-Chave: horta pedagógica; educação alimentar; alimentação saudável; sustentabilidade ambiental; aprendizagem à base de horta.

Abstract

With the growing population living in urban areas, and the environmental costs this entails, schools have a fundamental role to play in promoting eating habits that are not only healthy but also environmentally sustainable. This reflection on how the school can serve as a vehicle for Food Education led to the subject of school gardens, which are a good tool for involving children and the entire school community in food production, raising awareness of environmental issues and promoting healthy eating.

The aim of this project is to promote the integration of school gardens through garden-based learning, using them as a tool for food education, combining health and environmental issues and encouraging contact with nature in urban centers.

The development of this project was based on a Descriptive Memoir, which had several stages: a) a first chapter with a literature review of topics related to food, sustainability and education; b) a second chapter with a literature review of qualitative methodology, data collection and analysis, and ethics; and c) a third chapter with a characterization of the context as well as the analysis of the semi-structured interviews with teachers from a primary school in the Porto Metropolitan Area and the dynamic focus group with students from the same school.

The results of this analysis and the literature review led to the proposal of the “Hor(t)a H” project, which also aims to be adapted to other contexts in other schools, encouraging the vegetable garden as a tool for food education.

Keywords: school garden; food education; healthy eating; environmental sustainability; garden-based learning.

Index

Acknowledgements	2
Resumo	3
Abstract	5
Abbreviation list	9
Figures list	9
Tables list.....	10
Introduction	11
1. The vegetable garden as a tool for food and nutrition education.....	11
a. Justification and relevance of the topic	11
2. Opting for designing a project	15
Descriptive Memory	18
Chapter I – Food, Sustainability and Education	18
1. Cities and its impact on the environment.....	18
2. From farm to fork (and beyond)	21
3. The role of schools.....	23
4. Garden-based Learning.....	25
Chapter II – Methodology and ethics	27
1. Epistemology, methods and ethics	27
a. Documentary analysis	29
b. Semi-structured interview.....	29

c. Focus group	30
d. Ethics	31
2. Data collection	32
a. Informal observation	32
b. Semi-structured interviews with the teachers	34
c. Focus group with the students	35
3. Data analysis	36
4. Constraints	37
Chapter III – Characterization of the context	39
1. The teachers’ perspectives	43
a. Theme: past	44
b. Theme: present	48
c. Theme: future	51
d. Discussion	53
2. The students’ perspectives	57
a. Discussion	60
The “Hor(t)a H” Project	64
1. Introduction	64
2. Goals	65
3. Choosing a name	66
4. Human resources	66

5. Premises and materials	67
6. Activity proposals	69
1. Training sessions.....	69
a. The vegetable garden.....	69
b. Composting	70
2. Exploring the school garden	71
3. Themed food fairs throughout the school year	74
a. World Food Day	74
b. Earth Day	75
7. Monitoring and evaluating	76
8. Possible entities and partnerships.....	76
9. Timeline	77
Expected outcomes and final assessments	78
References.....	80
Appendix	85
Appendix Index.....	85

Abbreviation list

WHO – World Health Organisation

SDG – Sustainable Development Goals

SG – School garden(s)

MCC – Maia City Council

GHG – Greenhouse Gas

COP – Conference of the Parties

IPCC – Intergovernmental Panel on Climate Change

FAO – Food and Agriculture Organisation

HPS – Health Promoting School

ELO – Essential learning objectives

GBL – Garden-based learning

PS1 – Primary school

MSG – M School Grouping

Figures list

Figure 1 – The vegetable garden

Figure 2 – The orchard

Figure 3 – The dehydrator machine

Figure 4 – The canteen

Figure 5 – The school kitchen

Figure 6 – Drawing of a 1st grade student

Figure 7 – Drawing of a 1st grade student

Figure 8 – Drawing of a 2nd grade student

Figure 9 – Drawing of a 2nd grade student

Figure 10 – Drawing of a 3rd grade student

Figure 11 – Drawing of a 3rd grade student

Figure 12 – Drawing of a 4th grade student

Figure 13 – Drawing of a 4th grade student

Tables list

Table 1 – Key figures of the school grounds

Table 2 – The canteen and kitchen space

Table 3 – The students' drawings

Table 4 – The project's timeline throughout the school year

Introduction

1. The vegetable garden as a tool for food and nutrition education

a. Justification and relevance of the topic

Throughout my academic background, I've always been connected to the school environment - from traineeships done in schools (from my first university degree in Translation and Interpretation in Portuguese Sign Language), to traineeships in institutions with close contact to schools (such as the Maia Municipality, that was part of the conclusion of my degree in Nutrition Sciences). This change in paradigm, from an active presence in the classroom to a more wide-range and, by comparison, indirect practice, arose new concerns in me - the impact of the nutritionist in the classroom did not seem as relevant, or as needed, as the presence of the sign language interpreter, without whom the students would not have proper access to their education. However, and we now know it very well, diet has a great impact on children's learning and health - and the nutritionist should not continue being seen as an accessory to education.

One thing that did not receive my proper attention at the time, as a child enrolled in primary school, was food. Growing up in the 90's meant snack bars had all types of products available, there were not guidelines for how lunch should be served or what it should contain. I cannot stop but think how irrelevant food and diet seemed to me, back then; I lived nearby, about a 5-minute walk, and went home for lunch during primary school, so lunch was not a sharing (and social) experience between me and my classmates. It was not until my degree in Nutrition Sciences that food and diet in schools had a real impact, not only as a good opportunity to

eat healthy, but also as a moment to share food and feel a sense of belonging to a community.

My focus on school meals has happened ever since I began my journey in the world of nutrition. During my academic traineeship, the creation of a project to fight food waste in some primary schools of the Maia Municipality highlighted a frequent issue: fruit and vegetables are among the most wasted foods at lunchtime. This is even more relevant when we know that, according to the latest National Food Survey, 72% of Portuguese children do not meet the World Health Organization (WHO) recommendation for fruit and vegetables consumption (400g/day)⁽¹⁾, making food and nutrition education essential for promoting a healthy (and sustainable) diet. We also know that almost $\frac{1}{3}$ of all foods produced for human consumption are wasted⁽²⁾.

Food and biological waste make up more than 50% of all urban waste, which is normally the most expensive part of the budget for most municipalities⁽³⁾. With the rise in urbanization since the 90s, city lifestyles have massively contributed to the consumption of processed foods, with low nutritional value - in mid-to-low income countries, this consumption has risen 5.45% annually, between 1998 and 2012⁽⁴⁾.

All of this has made me think: how can schools help improve the diet of children living in urban areas, while also trying to raise awareness for a more sustainable consumption?

All United Nations Member States adopted, in 2015, the 2030 Agenda for Sustainable Development, which “provides a shared blueprint for peace and prosperity for people and the planet, now and into the future”⁽⁵⁾. At the centre of

it are the Sustainable Development Goals (SDG), which encompass different genres of sustainability, from economical, to social or environmental⁽⁶⁾. The journey started in June of 1992, in Rio de Janeiro, where Agenda 21 was adopted - it featured a plan of action meant to move towards sustainable development through improvement of human lives and protection of the environment⁽⁵⁾. Nowadays, an annual follow-up and review of the SDGs is done through a United Nations platform. Two out of the seventeen proposed SDGS are related to environmental sustainability:

- SDG 12 - Ensure sustainable consumption and production patterns
 - 12.8 By 2030, ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature
- SDG 13 - Take urgent action to combat climate change and its impacts
 - 13.3 Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning

Both, which include education for global citizenship and education for sustainable development, are recommended to be widespread through (a) national educational policies, (b) educational programmes, (c) teacher training, and (d) student evaluation⁽⁶⁾.

Schools are educational and health-promoting spaces and, as such, a privileged space to set a scene that values healthy and sustainable eating, not only through school meals but also as part of the school curricula⁽⁷⁾. It is also a place where children spend most of their day, for several years, and during which they go

through the fundamental stages of their development, making teaching and the daily practice of a healthy and sustainable diet essential - through which food and nutrition education should be efficient, comprehensive and with lasting results⁽⁸⁾. School programmes and policies that are holistic and coherent are fundamental to assure children's rights to food, education and health. Through complementary interventions, such as healthy school meals and food and nutrition education, students can improve their diet and develop healthier and more sustainable food practices, as well as extend those to their families and communities⁽⁹⁾.

There is a great variety of teaching methods to be used, according to the learning goals: from classroom debates, worksheets, keeping food diaries, purchasing simulation exercises, food tastings, creative activities (such as theatre), among others⁽¹⁰⁾. Extracurricular activities are also challenging and could include vegetable gardens in schools, developing culinary skills, exhibitions or others like workshops.

The school garden (SG) is a useful tool to engage children in the food production, to help reflect on production and consumption patterns, and to promote healthy eating habits⁽¹¹⁾.

Being currently in the middle of the second decade of the 21st century, it is important to take the focus away from just eating healthily and combine it with a healthy lifestyle that is congruent with environmentally sustainable consumption patterns. According to the Youth Agenda for Health 2030⁽¹²⁾, one of their goals is to combine sustainable production, distribution and consumption of food products with the promotion of healthy eating. One of the pointed-out strategies is the

creation of vegetable gardens, along with culinary workshops, in order to contribute to greater awareness regarding food health and environmental sustainability.

2. Opting for designing a project

In Food and Nutrition Education it is important to compare what the literature says with the reality of the context (in this case, schools). For all the specificities and peculiarities of Portuguese schools, I felt like there was no point in me doing anything other than designing a project that could be replicated throughout other schools in the country, adaptable to any circumstance. Therefore, close contact on the ground is essential to understand what common barriers and needs can exist to the implementation of a project; this data will be crossed with what already exists in literature, in order to be based in scientific evidence, and compared to other similar experiences in schools, so as to understand if they resemble or diverge.

I then set out to explore this reality in a primary school - since these are under the responsibility of local councils, I reached out to the Maia City Council (MCC). Having previously been involved with a project in some of their schools - for the conclusion of my degree -, I thought it would make sense to be in a more familiar environment and work with a municipality open to new projects. The point of being on the ground is to interact with the main actors in the day-to-day running of the school (leaderships, teachers, students) and understand what they know about or have experienced with vegetable gardens. The MCC was very interested

in the project going forward and promptly offered support for any stage of the design process; the school cluster's director was also very interested in the project. Eventually, this project could also be replicated to the other primary school in the Maia School Cluster - as a first step - and, eventually, accepted in other primary schools in the municipality. Despite initial setbacks and eventual delays in the process, both institutions being openly interested and welcoming made me very motivated to create and design the "Hor(t)a H" project.

The structure of this paper features a descriptive memory, which is meant to report all the steps that happen during the creation and design process of a project. It is based on knowledge of Nutritional Sciences and Food and Nutrition Education, with a particular focus on sustainable and healthy eating in schools and educational tools to achieve it - the vegetable garden, in this case.

Once again, one of my aims was to contrast theoretical aspects about SG - its benefits and use - with the inconsistencies of the real world. Thus, getting in touch with the reality of the school itself was essential to the process - by getting to know the day-to-day life of the school and everyone who takes part in it as a way to understand identify issues, barriers or needs:

- What physical space is available for the vegetable garden?
- Which human resources are there for the implementation and maintenance of the SG?
- What are the school's past experiences with vegetable gardens?
- What do teachers know about them?
- What opportunities are there to teach food-related topics in and outside the classroom, using the SG as a teaching tool?

- What do the students know about vegetable gardens?

The answers to these central questions would lead to the development of the project, making all the actors participants in the creation of it.

Descriptive Memory

Chapter I – Food, Sustainability and Education

1. Cities and its impact on the environment

Urbanization has had an unprecedented growth all over the world. About 55% of the world population reside in urban areas⁽¹³⁾, and 85% live less than 3 hours away from an urban centre⁽¹⁴⁾. By 2050, the population living in urban areas is expected to increase by 2.5 billion⁽¹³⁾. Nowadays, cities occupy 3% of Earth's surface but are responsible for about $\frac{2}{3}$ of the demand for primary energy and 70% of global CO₂ emissions⁽¹⁵⁾ - the food sector is one of the consumer sectors that emits the most greenhouse gases (GHG) *per capita*⁽¹⁶⁾.

The industrial period transformed how we acted, how we created and how we need to dominate the material world - this came from decades of exaggerated use of our natural resources and the final result is a worryingly unsustainable world⁽¹⁷⁾. With the growth in interest for sustainable practices - whether that's socially, economically or regarding the environment - public entities look for ways to promote (and practice) social and environmentally responsible behaviours.

The Brundtland Report first defined sustainable development as “meeting the needs of the present without compromising the ability of future generations to meet their own needs”⁽¹⁸⁾. The rising awareness that developed countries were the main culprits in the damage done to the environment lead to the first steps in fighting climate change. States that are part of the Parties are, then, responsible for reviewing the implementation of the Convention and any other instruments

adopted by the COP, while also promoting the effective implementation, institutionally and administratively, of the Convention⁽¹⁹⁾.

The Earth Summit happened in Rio de Janeiro, 1992, and was dedicated to worries and proof that the Earth was warming up and the climate was changing rapidly - the United Nations Framework Convention on Climate Change is signed, establishing that so-called developed countries should do more to fight GHG emissions, since historically they emit the most⁽²⁰⁾. The Kyoto Protocol was born in 1997, during the COP3 in Japan - it is an international legal treaty that sets limits on GHG emissions for a group of developed countries (i.e. the most polluting); the protocol would only come into force eight years later (in 2005), after being ratified by Russia and fulfilling ratification requirements - having at least 55 countries representing at least 55% of emissions.

After a decade of failed attempts and the average global temperature had risen by more than 1 degree Celsius (compared to the pre-industrial average), the COP21 negotiations resulted in the historic Paris Agreement⁽²⁰⁾. Unlike the Kyoto Protocol, the Paris Agreement does not set emission targets; instead, it holds countries accountable for presenting and meeting these targets, while also committing to keep the global warming within 1.5°C. In 2018, Intergovernmental Panel on Climate Change (IPCC) scientists warn that targets set by the Paris Agreement were not enough and that, to avoid the worst effects of the climate change (animal extinction, ecosystems destruction, extreme heat phenomena, melting ice), the world would need a deep and unprecedented change.

The IPCC releases two reports in 2019 warning about the urgency to avoid a climate catastrophe⁽²⁰⁾. The first is a specific report on gas emissions originated in changes in land use (responsible for 23% of all gas emissions), proposing solutions

based on land and forests and warning about the effects of excessive production of meat in deforestation and methane emissions. On the same year, UN also warns about human action and how it's endangering one million species of animals and plants.

With goals now aiming at 2030, and despite more and more reports of heat waves^(21, 22) and the harmful impact of the temperatures rising, a real, significant impact still hasn't happened. In 2019, massive student mobilizations broke out across the globe - which started with Greta Thunberg's 'Fridays for Future' movement - demanding climate justice; this change in action, with the generations of the future now actively participating, makes it fundamental to involve schools, children and teenagers in the fight against climate change - they are, after all, the main ones affected by it.

And as the global population grows and migrates more and more to cities, city governance should approach sustainability from a local perspective. So, sustainability campaigns should have an impact on cities due to the large population and to guarantee future city management is done sustainably - this would make economy circular, creating internal production circles⁽²³⁾. Cities would be able to turn focus away from recycling and be able to control carbon emissions, create water cycles and forms of renewable energy, and recuperate and reuse its' own resources. Another important factor for sustainable cities is promoting well-being, housing and social inclusion through public services and premises, such as green, public spaces, public transportation, among others⁽²⁴⁾. This means the most significant factor for a sustainable city is directly related to governmental and municipality support.

In Portugal, the reflections, documents and strategies of the Aalborg Charter led to the development of the National Strategy for Sustainable Development, approved by the Council of Ministers in 2005⁽²⁵⁾. The intervention policies were aimed for the 2005-2015 period and based on the country's weaknesses and potential, gathering a set of policies that would ensure rapid and vigorous economic growth, greater social cohesion and a growing level of protection of the environment⁽²⁶⁾.

An analysis done on the influence of European Union investment programmes in sustainability in the Portuguese municipalities, from 2000 to 2014⁽²⁷⁾, concluded that the ones considered sustainable were more efficient due to their solid levels in governance, governmental efficacy, economic and social development and/or financial sustainability. Cohesion policies were the ones that seemed fundamental to guarantee sustainable development.

Regions depend on the environment and surrounding ecosystems to sustain life, health, security and social cohesion and, thus, have no choice but to create new economic opportunities (green and circular) that guarantee the long-term functioning of a city and quality livelihoods for its citizens⁽²⁸⁾.

2. From farm to fork (and beyond)

The Right to Adequate Food is fundamental to the fulfilment of human rights. The United Nations Committee on Economic, Social and Cultural rights considers that “the right to adequate food implies: the availability of food in a quantity and quality sufficient to satisfy the dietary needs of individuals, free from adverse substances, and acceptable withing a given culture; the accessibility of such food

in ways that are sustainable and that do not interfere with the enjoyment of other human rights”^(29, 30).

However, not everyone is able to access safe, affordable, healthy diets. Urbanization, globalization of agricultural markets, and incomes are some of the drivers to changing diets. In order to improve them, the whole food system must be considered - from “production, aggregation, processing and packaging, distribution, marketing, consumption and disposal of food products”⁽³¹⁾. Food systems are responsible for approximately 20-35% of greenhouse gas emissions and, consequently, leads to land conversion, deforestation and loss of biodiversity. If we focus on agriculture alone, it is one of the major water polluters and accounts for about 70% of global freshwater withdrawals.

In 2014, the Food and Agriculture Organization (FAO) and WHO recognized that “current food systems are being increasingly challenged to provide adequate, safe, diversified and nutrient rich food for all that contribute to healthy diets due to, inter alia, constraints posed by resource scarcity and environmental degradation, as well as by unsustainable production and consumption patterns, food losses and waste, and unbalanced distribution”⁽³²⁾. Current food systems are also inequal in power, with profits being unevenly distributed and leaving the most vulnerable behind⁽³¹⁾.

According to FAO and WHO⁽³¹⁾, sustainable healthy diets are varied, balanced and low in processed food and drink products; “include (...) an abundance and variety of fruits and vegetables”; “maintain greenhouse gas emissions, water and land use (...)”; “preserve biodiversity (...)”; “minimize the use of antibiotics and hormones

in food production”; “reduce food loss and waste”; “(...) respect local culture, culinary practices, (...) and values (...) the way food is sourced, produced and consumed”; and “are accessible and desirable”.

3. The role of schools

Schools are a primary intervention site to fight malnutrition and obesity⁽³³⁾. A Health Promoting School (HPS) is defined as a space organised in human and technical terms, that is committed to providing the development of personal and social skills that enable individuals and groups to improve the management of their health and act on factors that influence it⁽³⁴⁾. Among an European HPS’s principles, the following stand out: (1) promotion of students’ health and wellbeing; (2) the defence of the principles of social justice and equity; (3) a safe and supporting environment; (4) student participation and the development of their skills (empowerment); (5) linking health and education issues and systems; (6) addressing health and wellbeing issues with the whole school community; (7) collaborating with students’ parents and the community; and (8) the integration of health into school activities and programmes and the assessment criteria⁽³⁵⁾.

Knowing and understanding the schools’ curriculum is essential to the incorporation of experiential learning and to maximize its benefits; some common strategies include identifying learning objectives, determining acceptable evidence of learning, and designing appropriate educational activities⁽³⁶⁾. For Portugal’s Directorate-General for Education, essential learning objectives (ELO) are “a common set of knowledge to be acquired, identified as the contents of

structured, indispensable, conceptually articulated, relevant and significant disciplinary knowledge, as well as skills and attitudes to be developed compulsorily by all students in each component of the curriculum or subject, usually with reference to the year of schooling or training”⁽³⁷⁾. These documents serve as the basis for the schools’ decision making on an adequate and contextualized school curriculum, from planning to teaching and learning, including internal and external assessments of the students’ learning.

The educational project and the annual activity plan are instruments of autonomy for all school groupings. The educational project is defined as a “document that enshrines the educational orientation of the school grouping (...), drawn up and approved by its administrative and management bodies for a three-year period, which sets out the principles, values, goals and strategies according to which the school grouping or non-grouped school proposes to fulfil its educational function”⁽³⁸⁾. The annual activity plan is a planning document, which defines “in the light of the educational project, the objectives, forms of organisation and programming of activities and identifies the resources needed to carry them out”⁽³⁸⁾. Both of these documents are management instruments, with the first clarifying and communicating the pedagogical, curricular, cultural, administrative and property issues of the school group, and the second implementing the principles, values and goals described in the educational project, through activities to be carried out. It seemed important to review these two documents along with the ELO, so as to understand the importance given to healthy eating and environmental sustainability in the school grouping - and help figure out how the school garden can be integrated.

Nutrition education is defined as “any combination of educational strategies, accompanied by environmental supports, designed to motivate and facilitate voluntary adoption of food choices and other food and nutrition-related behaviours conducive to health and well-being. Nutrition education is delivered through multiple venues and involves activities at the individual, community, and policy levels”⁽³⁹⁾. It should be part of the school curriculum for all ages, progressively, with the inclusion of objectives, content and assessment criteria related to both food and nutrition⁽¹⁰⁾.

4. Garden-based Learning

Passive styles of learning, used by the majority of schools around the world, have often been shown to be less effective than active ones, like projects and real-world problem solving^(40, 41). Students that are involved in hands-on approaches to learning actually meet, and exceed, the educational benchmarks of their peers^(42, 43) - which is why a focus on those learning practices are starting to be adopted by some countries and schools, whose students (in and outside the classroom) are reaping the benefits⁽⁴²⁾.

Garden-based learning (GBL) encompasses different styles of teaching and learning through a hands-on approach⁽⁴⁴⁾, as students can hear, see and feel what they are learning about in-classroom - no matter the subject -, with the different elements of the garden engaging many types of learners⁽⁴⁵⁾. This technique can take place in varied geographical regions and can be adaptable to both rural and urban settings^(46, 47). Being in an outside environment also boosts the students'

environmental consciousness, allowing them to explore the great outdoor while having a more versatile and flexible curriculum⁽⁴⁸⁾.

A garden-based curriculum also allows for food and nutrition education, as students who learn about food and nutrition through gardens improve their knowledge about healthy eating^(49, 50) and their diet at home⁽⁵¹⁾. Younger students are also particularly benefitted, as GBL is an engaging way to learn about food and nutrition⁽⁴⁹⁻⁵¹⁾, and those who had a garden-based curriculum had a higher availability of low-fat vegetables at home⁽⁵¹⁾. Garden-based activities also offer a way to integrate family stories about plant growth and use⁽⁵²⁾.

Diversified crops from SGs can also potentially be utilized to provide food for school lunches and snacks, supplementing healthy meals that help fulfil the students' nutritional needs⁽⁵³⁾; this could help mitigate health conditions that are common during childhood, such as malnutrition and obesity, that originate from improper nutrition. School gardens with a varying range of fruits and vegetables allow for the children to grow properly and have the energy needed to succeed academically, as they help children make healthier choices and boost their nutrition levels⁽⁵⁴⁾; the rising interest in the consumption of fruits and vegetables may also make students more apt to try new foods, that are more nutritious, if they are part of the gardening process⁽⁵⁵⁾. If children share both their knowledge and the produce with their families, accessible SG could also be a way to improve entire communities' nutritional needs⁽⁴⁷⁾.

The whole school community - students, teachers, parents, and others - can be united by SG, which provides a site for collaboration and problem solving and can be a means for social growth⁽⁴⁷⁾. If SG are associated with home gardens, the

students' knowledge can also be applied beyond the school grounds and become part of their lived experience⁽⁴⁷⁾; children also become better communicators, improve their self-confidence and self-understanding skills, and develop initiative, with overall improvements in behaviour^(56, 57). The process of starting and caring for the vegetable garden - digging, planting and weeding - is also a source of exercise and fresh air, that students don't usually get to enjoy while in the classroom⁽⁵⁸⁾.

Chapter II – Methodology and ethics

1. Epistemology, methods and ethics

Constructivism assumes that varying realities exist and that both the researcher and the participant create knowledge naturally. In contrast with positivism, which uses concepts such as reliability, internal and external validity, and objectivity, constructivism uses concepts such as credibility, dependence, confirmability and transferability⁽⁵⁹⁾. The interpretivist paradigm falls under constructivism; it considers that there is an interaction between subject and object, where knowledge about reality is constructed through interaction between people and the world and is dependent on a social context⁽⁶⁰⁾. It tries to understand a social phenomenon through the participants' perspective, so the research must happen in the natural context in which the phenomenon in question occurs⁽⁶¹⁾.

It is important to know the subjects within a given reality; understanding how topics such as diet - and, in this concrete case, vegetable gardens as a tool for education - are treated in schools allows to improve food and nutritional education

in that context, understand what needs, difficulties, barriers exist and position all the different actors for change. Comprehending how diet is addressed on a curricular level also allows for a more adequate intervention.

The qualitative method does not aim to measure, enumerate or use statistical tools to analyse data⁽⁶²⁾. Some of the questions are defined as the study progresses and become more direct and specific throughout time. The data is obtained by the researcher on the ground, is descriptive and about people, places and interactions. It aims to understand phenomena through the participants' perspective - it is not reduced to variables. Qualitative methods allow for more in-depth understanding of a certain event, with the possibility of explaining behaviour. They intend to provide an ethnic view, working with a large number of questions in a small group of people, whose choice is made according to the goals set⁽⁶³⁾.

Qualitative methods rely mostly on observations, interviews (in-depth, group) and building networks of relationships for data collection. Because it is in-depth, these methods offer a good insight into people's lives and allow non-verbal behaviour and unexpected information to be included in data collection - which is not the case with closed questionnaires. Nevertheless, qualitative techniques demand detailed work, with a lot of time invested and training the researcher's skills. As it doesn't work with large samples, it also doesn't allow for generalisations⁽⁶³⁾.

Since this is a project, and knowing the above mentioned, it would make the most sense to know reality of a specific context directly with the actors, opting for qualitative methods to assess needs and be able to be part of the design of the

project. A diagnosis was made and served as basis of the project design, happening in two phases: (1) documentary analysis, (2) semi-structured interview, and (3) focus group; the latter two will be evaluated through content analysis.

a. Documentary analysis

Official documents give information on the power of educational institutions and how different actors from the educational community communicate⁽⁵⁹⁾. It allows data collection through a primary document to a secondary one, whose data is the indexed and classified into keywords, descriptors or indexes, according to the goals of the analysis⁽⁶⁴⁾. The data collected for this project will be obtained through indirect technique, meaning it will be from primary documents - namely, the documents containing the essential learnings for primary schools which make mention to topics related to SG ('food', 'diet' and 'environmental sustainability'), in order to figure out how they can be taught in-classroom; and the documents pertaining the educational project and the annual activities plan, so as to understand how and when the school garden can be integrated in the school day-to-day running. Documentary analysis relates the frequency with which certain themes, words or even ideas appear throughout the text, measuring the relative weight attributed to the subject under study⁽⁶⁵⁾. The purpose is to see how the vegetable garden can be used as an educational tool that complements regular in-classroom lessons.

b. Semi-structured interview

The semi-structured interview is one of the main qualitative tools because there is no rigidity in the questions, thus allowing the interviewee greater freedom in the answers they give and according to their references, highlighting what is most relevant to them, and enabling the desired information to be obtained immediately and in a current manner⁽⁶⁶⁻⁷¹⁾. It contains a script, with questions planned in advance and sorted logically to the interviewer, which allows to obtain the essentials through interaction with the interviewee⁽⁷²⁾. The data is usually obtained through audio recordings and then transcribed, followed by content analysis.

In the context of this project, interviews will take place with the school's leadership and teachers to figure out what degree of importance healthy and sustainable eating has, what knowledge and experience they have about and with SGs, and what needs there are.

With the school's coordinator, it's important to understand (a) what conditions exist in terms of physical space available for the vegetable garden - does the school already have one?; is there space to implement one if it doesn't? - and (b) what human resources are available - does the school have a gardener?; does it have someone who can look after the vegetable garden?; can they afford to hire someone, if needed?

With the teachers, understand what space there is to teach food-related topics in the classroom (and outside of it, too), with the garden as a teaching tool.

c. Focus group

Focus groups can be described as research devices in which the researcher means to collect data on a certain topic, which originates from dialogue and debates between people, reunited at the same place and during the same time, who are part of their research⁽⁷³⁾. As a technique, focus groups occupy an intermediate position between participant observation and in-depth interviews. They can also be characterized as a resource to understand the social perceptions, attitudes and representations construction process among human groups⁽⁷⁴⁾.

When designing a project for children, they should be heard. Children are dynamic social agents and active participants in their own lives, in the lives of the ones that surround them and in the societies they live in^(75, 76). But because they are minors, an informed consent will be given to their parents to approve their participation in the project; it will only happen if the students agree to it. Then, through a representative sample from each school year - done by convenience -, the goal of the focus group is to understand what the students know about vegetable gardens. Given the ages of primary school children, a regular focus group seemed too formal; so, the dynamic will involve graphical representations of the students' answers.

d. Ethics

Since the project involves working directly with a primary school and its students (children between the ages of 6 and 10), it's important to guarantee some aspects when designing the project and collecting data. First of all, the right to be informed - for that, informed consents were made with the purpose to explain the aim of the project, proceedings, data collection and confidentiality, the right to

refuse to participate, potential risks and who's involved in the project. After that, at the data collection segment as well as the writing process, ensure that no personal data or characteristics that could identify them appear in any part of the written work. It's also important that the students who agreed to participate actually consent to their participation, despite the parents' permission.

2. Data collection

a. Informal observation

The first time visiting the school happened in February and provided valuable information regarding the SG. When talking with the school's coordinator, we learned the school already had a vegetable garden; a couple years back, a teacher, that was no longer teaching at the school, created it. The garden stands at one of the edges of the grounds, near the preschool classrooms. It is also near a river, external to the school; this resulted in an increase in pests spoiling the vegetable garden, particularly moles and rats that dug up from beneath it. A lack of water source near the garden was also appointed as a difficulty in maintaining it; they had to carry around large quantities of water in heavy jugs. When summer came, due to the garden's location, there was too much exposure to the sun and the plants ended up burnt. Also, during that time, which coincides with the school holidays, there was no one to look after the vegetable garden - there was no gardener and teachers were not there often enough.

Since it was a visitation where I accompanied someone working in the Education division of the municipality, as the issues were being listed, most of the issues had solutions through proper planning and help from the Environmental division - who

showed availability to resolve them in case the project went ahead -, such as: placing slab beneath the soil, so the moles couldn't reach the garden; placing a net around the garden, to stop rats getting in; and having a water source near the garden site. We also visited the school grounds, starting with the vegetable garden and following along to the space where it could be relocated to - a bit ahead of the current spot -, then moving onto the orchard and, finally, the dehydrator machine. I was also shown the kitchen and canteen area.

Initially, this project was only intended for primary school grades. During the first visit to the school, a meeting with the school coordinator took place - to talk about the project and the intention behind it, to see if they were interested and available to participate in it. I was first confronted with a lack of openness to work with primary school teachers, due to the amount of work - and usual lack of time for extra activities - they have during the school year. Still, the school was chosen because of its apparent interest in environmental sustainability (due to the existence, and use, of the dehydrator) - and so, the road to acceptance seemed like a short one.

During that same visit, the scope of the project also took a different, broader turn: the preschool teachers showed interest in taking part in it. During the conversation, I realised they had a big role in the existence and continuation of a SG. Not only are they currently responsible for a vertical garden for the preschool classes, they also usually work on the topic with them - this was later confirmed through the interviews and the focus group with the students, as most of their experiences with vegetable gardens happened during that time period (at whichever school they attended). They also noted that a great focus on healthy

diets is put on children of preschool age, and then it stops happening during primary school - in all fairness, this is also why I had opted to focus on primary schools. Therefore, the question arose: how could I revive the concept of a vegetable garden in this school and now include other grades?

A few months passed between the first visitation and the dates set for the formal data collection which took place in July, on two consecutive days: the first one for the interviews with the teachers, and the second for the focus group dynamic with the students. An interview with the coordinator was set to happen before visiting the school but, as most of the questions were answered during the talk with both her and the preschool teachers, and also the school tour, it was decided to not go forward with that particular interview.

b. Semi-structured interviews with the teachers

The aim of the interviews with the teachers was to understand what opportunities there are to teach food-related topics in the classroom (and outside of it, too), with the vegetable garden as a teaching tool. The interviews were semi-structured, allowing the teachers more freedom to express their opinions, but with some guidance regarding the topics to be addressed, namely: their previous experiences with vegetable gardens (in and outside the school context), how the garden could be integrated in the school's routine, and what they know about the GBL method. The interview was conducted following a script that featured three main blocks of questions about the topics mentioned above and a fourth one for

suggestions, while also leaving room for other relevant topics that could arise (ck. Appendix III).

One teacher of each grade, including preschool, were invited to participate in the interviews. A classroom was borrowed to conduct them, during one morning, and they happened in an orderly fashion: started with a preschool teacher and ended with a 4th grade teacher. All interviews were recorded using a cell phone, with their permission, and lasted less than 10 minutes each.

c. Focus group with the students

The aim of the focus group with the students was to understand what they know about vegetable gardens. Due to the different ages of the 1st to 4th graders, a traditional focus group seemed too formal and uncomfortable; hence, it was decided that the focus group, while still scripted, would take place in a more dynamic way - through drawings that represented the children's experiences/opinions. The script feature only one block of questions, with the topic corresponding to the aim of the focus group: to find out what the students know about vegetable gardens (ck. Appendix IV).

In total, 8 students were selected to participate, with 2 students representing each grade (from 1st to 4th). No preschool student was selected, due to their ages making it rather impractical to join the older children in the same group; with such a small group of students, it also wouldn't make sense to make two separate focus group. A classroom was borrowed to conduct the focus group, for one morning, with the students sat in a circle disposition with a table in front of them, with sheets of paper and coloring pencils at their disposal. The dynamic started

with a conversation regarding what a vegetable garden is and what they know about vegetables, which lasted for approximately 16 minutes, and ended with them drawing their idea of a vegetable garden - until they all finished.

3. Data analysis

The interviews and the focus group were both be analysed using the content analysis method. Content analysis is central to the research process as data should not only be collected, but also analysed and interpreted⁽⁷²⁾. After the data was collected, it was then processed by creating a documentary corpus, which had to be read active and attentively, so hypotheses could be formulated and then categorized.

Some documents were also used as support for the planning of the activities for the project, namely the school grouping's Educational Project and the 2023-2024 school year Annual Activities Plan, so as to assist future project activities to be carried out.

The content analysis of the interviews allowed to understand the teachers' perspectives on SGs and how they could be adapted to the school's own needs and characteristics. The interviews were then transcribed and the answers categorized, following four different aspects: thoroughness - guarantee complete overview of the materials to be used; representativeness - what is collected must be a faithful reflection of a larger universe; homogeneity - documents must refer to a certain topic and share similar characteristics; and suitability - documents should be adequate to the goals of the research. The categorization was initially based on the questions from the interview script but, upon other subjects brought

up during interviews, other categories emerged. After gathering the categorized content from the individual interviews, it was then regrouped into a new document, distributed among the different categories and compared within them - noticing what was similar and what was different (ck. Appendix V).

The students' drawings allowed to understand what they know about gardens and vegetables in general. The drawings were analysed in a similar manner to the interview, only changing the format of the documents. The drawings were first looked at individually, describing what elements each featured, and then all elements were categorized according to their nature and how often they appeared (ck. Appendix VI).

4. Constraints

Being in a school context and interacting with its key actors has its perks, but it also a few drawbacks. Timing started off as one of my biggest concerns for designing the project, especially as I knew I'd be dealing with a city council and a primary school - this ended up becoming a real concern, as timing was the main obstacle.

Despite an easy first contact with the MCC, the process actually took a while: between the first reunion at the MCC and the first visitation to the school, a couple week passed; from that first visit and until the next one, four months had passed. This delayed the design of the project, as the interviews and focus group would serve as base. The second visit to the school took place in May and I was able to talk to some of the primary school teachers about the purpose of my project and see if they were interested in participating. I waited for a response

regarding a date set for the interviews and focus group and, after a couple months, I decided to contact the school coordinator directly; both the interviews and focus groups were scheduled on the second to last week of July, happening after the school year ended. This meant some things didn't go according to plan: firstly, I didn't get the chance to observe the day-to-day running of the school and the interactions between the actors, as was intended; secondly, as the days of the interviews and the focus group were scheduled the day before the interviews, I wasn't as prepared as I could've been, especially considering I started excluding both of those moments from the data collection phase of the project. This led to some missteps and errors during the process of the interviews and, especially, the focus group discussion.

Having no experience as an interviewer, conducting the interviews for the first time was intimidating. I felt that I sometimes strayed away from my impartial and non-influential role, and that although the conversations rather flowed, I could have tried to nudge the interviewees who weren't talking as much - but as the situation was new to me and it was a bit on short notice, I didn't want to make them feel uncomfortable or judged.

The focus group conversation wasn't planned, as the purpose was to gather the student's perspectives and knowledge on vegetable gardens through drawings and then do content analysis on them. It was suggested by the school coordinator, who also proposed being present, to familiarize the students and make them more comfortable. The presence of a figure of authority does not guarantee a symmetric power relationship but, seeing as the students didn't know me, it didn't feel wrong at the time. However, while they ended up more comfortable during the drawing

part, the conversation often scattered out and didn't allow for a good comprehension of the students' knowledge on vegetable gardens; hence, it was excluded from the content analysis.

Chapter III – Characterization of the context

The primary school (PS1) was inaugurated in 2010 and is set on the Maia municipality, located in the centre of the Porto Metropolitan Area⁽⁷⁷⁾. Maia consists of 10 parishes and has around 136 thousand inhabitants, with a total area of 83 km². The PS1 belongs to the parish of Cidade da Maia, which is predominantly urban with a few rural features in its outlying areas⁽⁷⁸⁾. The school is set relatively close to the MCC building. The MCC has 7 school groupings under its tutelage, with a total of 35 public primary schools (including kindergarten). The school is part of the M School Grouping (MSG), along with another primary school, a middle school and a high school.

The MSG's administration is set in the main school, which is the high school, with each of the other schools having an establishment coordinator on site. In both primary schools with preschool education, the demand exceeds the grouping's response capacity⁽⁷⁸⁾.

Families of students value the importance of the school in their children's education and training, and the school, in turn, recognizes the role of families in the student's school performance. There is regular contact between the school, via the teachers, and the parents. Both students and teachers are actively

involved in implementing projects that enrich learning and promote the development of competences⁽⁷⁸⁾.

The school has a total of 369 students ranging from ages 3 to 10 years old, distributed through 4 kindergarten classes (of 95 children total) and 12 primary school classes (the remaining 324 children). Each class has one main teacher assigned, so there are 12 primary school teachers, and 4 teachers assigned to the preschool classes. Primary school teachers usually accompany each class from 1st grade throughout 4th grade, unless someone moves schools and another teacher substitutes for the remaining school years. As for the operational assistants, there are 10 on permanent employment (through the MCC) and 5 that rotate each year (employed through the employment centre), bringing them to a total of 15 each school year.

The PS1 is a building with 2 floors featuring a modern architecture and is close to the Maninhos municipal park⁽⁷⁹⁾. The school has a computer room, a library/resource centre, a playground and an outdoor sports park. The grounds also feature an orchard - with orange, lemon, apple, pear, fig and olive trees - near the sports park and a (now) unused vegetable garden, near the preschool classrooms; these two spaces are on opposite ends of the school ground. The school also has a food waste dehydrator machine, located outside and near the kitchen area, lent by the municipality's Environmental department as of march of 2023. The equipment allows food waste to dry into nutrient-rich organic material and the end result is a dry substrate (similar to coffee grounds) that can be used as a fertilizer - thus contributing to a circular economy⁽⁸⁰⁾. This was one of the

reasons the school was chosen for the project: to make the best of - and encourage - more sustainable production practices (by using the SG) while simultaneously fighting food waste (by decomposing eventual food waste). Also, as noted before, food and biological waste is one of the most expensive parts of a city's budget - so it would make sense to fight it with all means possible; and this equipment is certainly a helping hand.



Fig. 1 The vegetable garden in its current state



Fig. 2 The orchard**Fig. 3** The dehydrator machine**Table 1.** Key figures of the school grounds

As it is a school centre, the school kitchen is decently sized and all meals are done there, every day. Students are distributed by school years during lunch time, with preschoolers lunching first, followed by the 1st and 2nd grades and ending with the 3rd and 4th grades. Both the kitchen and the canteen seem big enough to utilize for eventual workshops or other vegetable garden/food-related practical activities.

**Fig. 4** The canteen



Fig. 5 The school kitchen

Table 2 The canteen and kitchen space

1. The teachers' perspectives

The perspectives and opinions of the five teachers interviewed regarding the school garden were very valuable; despite the interviews being rather short in time, they managed to point out some difficulties and barriers that led to the abandonment of the garden, as well as highlight why it wasn't used by some grades, along with some ideas for change that need to happen to make the school garden a reality for the whole school (from kindergarten to 4th grade), boosting its use and longevity. As the script for the interview followed a past-present-future flow, the results were presented as such.

a. Theme: past

Starting with the teachers' previous experiences with gardens, most teachers hadn't participated in activities related to the school garden, noting that *"We've never worked in the gardens themselves"* (669_2), while also stating they're aware of it: *"(...) I don't think I've had any experience. (...) we haven't been working directly with the preschool classes on the garden. (...) in here it's always the preschool classes"* (542_3); *"I never had. I know that, in fact, we had a garden here and I've seen how the project and the space were developed, and I noticed some activities that happened, but (...) I never had any type of contact, never worked on it, never been involved"* (564_1). As pointed out, it's the preschool classes that mainly use the school garden: *"(...) it was something that, as long as there's space and the chance to, I use it. A lot of the times that space doesn't exist and we try to do it inside the classroom, (...) because I think that... the children, first of all, like it, adore it. In fact, we had that experience here, hm, two years in a row - only this year we didn't"* (308_P) - this was otherwise known, from the first visit to the school.

There were two other types of experiences highlighted, from other schools they had worked at - either they had gardens in-school that were used: *"(...) in the various schools I've been to, we've had projects related to building vegetable gardens"* (308_P), and in a rural area: *"I come from a school grouping that was very focused towards the outside - it was an eco-school and one area that was worked on was precisely the vegetable garden"* (434_4), or the gardens existed but weren't used at all by the primary school classes: *"The [primary] schools I've*

been to didn't have a vegetable garden. Eh, last year's school, there was one in the school grouping. The school, as it was a primary school, didn't have one. (...)" (669_2).

Despite not working directly in the school's garden, some teachers' hands-on contact with vegetable gardens had usually entailed a more casual and personal experience: *"Yes, yes! I come from a village, so my parents own vegetable gardens"* (564_1) and *"Vegetable gardens, well, I go the village and have some contact, through my parents - I help sometimes. I know some things, not much"* (542_3); this might be typical of their generation, especially coming from outside big urban areas. Aside from a familial aspect, one teacher detailed garden-related activities done during class: *"everytime I worked with them we used pots - we'd work on the topic but using pots. (...) in here, this year, I didn't do anything"* (669_2), while others elaborated further on what was done: *"Every class, from preschool through 4th grade, was responsible for a little piece of the garden, which they cultivated products, and then we had a very strong connection with the community and the family - the grandparents had a day to help sow, plant, take care of our spot, and then in the canteen, until harvest time, and it was from farm to table"* (434_4) and *"(...) I created a vegetable garden in the school I was at. I was the one who organized the garden for the primary and the preschool classes"* (308_P). This teacher also mentions some important steps done for the process of learning how to garden: *"at the time we had training with Lipor, to learn a bit about the dynamic, what type of products we can plant or sow at certain times of the year, and we tried to manage the situation like that. And they participated in the whole process: from preparing the dirt, to sowing,*

sometimes we did the germination in the classroom and then we replanted into the garden. So, they then did the whole watering process, removing weeds” and “So, then, some crops were done during Springtime, (...) and they participated in the harvest as well, in the food preparation: salads, vegetables, all of that” (308_P). Since the teachers’ experience with gardens is mostly a personal one, it seems fundamental to integrate training in how to sow and plant and how to take care of the garden; this technical support was later mentioned, during the suggestions part of the interview, by one of the teachers as an important part of the project: “(...) the only thing that worries me, actually, would be helping with the maintenance - (...) even though I have contact with vegetable gardens, in this moment, I couldn’t imagine initiating the practical aspect” (564_1).

One of the goals of the interview was to assess what were the positive and what were the negative aspects of the school garden. As the preschool teachers were the only ones working in the school’s garden, the experiences reported concerning this were down to one single teacher. *“And we did a very interesting job in a food education level because (...) when they [the children] actively enter and participate in these processes, it’s a lot easier to then get to that point where we have to taste - because it’s something we produced, something we treated”; “And I know children always find it harder to eat when they see the vegetables there; and (...) on that day, they were so excited and looked at it proud to say ‘look, we’re eating our own cabbages”’ (308_P). This not only made children refuse vegetables less, but it was also something that excited them: “they liked that experiment a lot and usually (...) I think it makes sense to have vegetable gardens when there is space and conditions for it. (...) They talked a lot about the garden this year, saying ‘what about the garden, teacher? Aren’t we using it?’” (308_P).*

Another aspect mentioned was the support from both Lipor and the Maia Municipality: *“I think we had help from both of them. Because the Municipality has a protocol with Lipor- (...) And [they] work in partnership and the Municipality arranged it [the seeds] for us”* (308_P). One teacher mentioned the need for someone to provide the necessary materials for the vegetable garden, as a suggestion for the project: *“Right, more technical - since the garden would be organic, we wouldn’t use insecticides, herbicides, etc. How to fight - or if we’d have to fight - in any way, pests (...). Products as well. Materials and products are something that, in schools, is also hard to have access to - how would we have access to them”* (564_1). Despite the school’s dehydrator machine not being used to compost food from the garden, as it didn’t exist in the school yet, training on composting was done: *“(...) I think, at the time, Lipor was also did that training”* (308_P). This activity *“happened throughout the school year”* (308_P). This is also a good segue into some difficulties encountered: *“(...) in the meantime other issues arose and the space became inadequate (...) for a number of reasons - amongst them, the animals”; “Predators, pests, and so. This year we didn’t go forward with it.”* (308_P). These were mentioned during the first visit to the school, along with the place where the garden currently is: *“(...) we always have that inconvenience. We have the stream next to it”* (308_P).

Some teachers talked about some activities done related to the garden, either directly or indirectly. The preschool classes made soup using a stove top *“(...) in the classroom and there was also a point where we also made a two-toned soup”* (308_P), which is when two soups are served on a plate and don’t mix. As per the training and experience mentioned above, composting was also one of the

activities done; I asked about the dehydrating machine once more but, again, it was done independently of it: *“No, since at the time- I don’t know if it existed already”*; *“The first year I arrived (...), I don’t think we had it yet. We composted - the first and second years”* (308_P).

The other experiences mentioned were down to the bean experiment, which is a common experiment done during primary school: *“We do a bit of it, during experimental sciences, with germination”* (564_1); *“(…) in last year’s school we did the bean experiment, which was then transplanted to a bigger pot for them to see; we also put lettuces, it was more leaf-based but everything in pots. We’d compare them, so the students could have the responsibility; (...)”* (669_2); and *“(…) even the bean experiment, we do it, (...) it’s the experiment with the bean plant inside the classroom”* (542_3).

One of the things brought up in conversation was how long - or how little - the teachers had been teaching at the school. Length of service ranges from as little as 3 years: *“(…) this is the 3rd year I’m here (...)”* (308_P) and *“three years ago. (...) [has been teaching] this class, from 2nd to 4th grade”* (434_4), with others in-between: *“(…) this year was my seventh”* (564_1), to as long as two decades: *“I’ve been here for 23 years”* (542_3). As was mentioned during the first visit to the school, the garden was started by a teacher that was no longer teaching at the school.

b. Theme: present

When talking about how to integrate the garden in-classroom, several ideas were presented, with the majority of teacher agreeing that it could easily be done. Most mention the Environmental Sciences aspect of learning: *“We also learn a lot (...) beside the food part (...). We follow the plants’ growth cycle. Then it’s their characteristics (...)”* (308_P); *“it was worked on during Environmental Studies class - along with plants’ growth, the light”* (669_2); *“I think in Environmental Studies, we talk about Nature, (...) we have to approach diet (...) I feel like it would fit, to substantiate it”* (542_3). They also agree other subjects could be adapted: *“(...) besides the whole dynamic of activities related to the land cultivation, with the sustainable production of food, (...) we could then also use it for all the other subjects. For mathematics, arts, environmental studies, (...) Portuguese- (...) I think it’s a very broad and interdisciplinary project”* (564_1); *“(...) we could, for example, relate to mathematics - measuring, calculating areas, the length, etc; the needed space for each product, (...). Then, the precautions needed [for] diet as well, talking about integrating vegetables and fruits in our diet - which is, also, a big battle for us -, writing. Observing in loco is extremely important, the various growth stages, the living beings’ growth phases - not just plants in this case, because the garden will also attract all the other part of the fauna”; “The ecosystem. (...) And physical education as well”; “I think that, at any point of the program, for every subject, we could always integrate it. Story building, (...) the scarecrows... There’s so much we could do to link to the vegetable garden”* (564_1); *“In Environmental Studies, you can do that perfectly, yes. Even for Portuguese, when we’re working on texts, I believe so, you can conciliate”* (669_2); *“Ah, it perfectly can! The contents we cover, the domains in the Environmental- it’s transversal. Even the three main subjects...*

It's perfectly framable and in every area" (434_4). The main issue was lack of time when it comes to a more experimental, practical learning, especially with the 3rd and 4th grades: *"Right, time is... It's what holds us back a bit. But some time during the week would be possible; a little, but we would manage it"* (542_3); *"Well, there... The programmes are very extensive, demanding and... in terms of time, timing, it's very limited. It doesn't mean you can't develop projects in that topic, but programmes do take up a lot, a lot of time"* (434_4). The lack of knowledge on vegetable gardens was also one of the constraints mentioned: *"the thing is, I don't have much knowledge on it"* (669_2).

Another one was in regards to the lack of support/encouragement from primary schools to have/use gardens: *"The school, as it was a primary school, didn't have one"*; *"Since we were the primary classes, the schools aren't very... (...) Prepared"* (669_2); *"Never. This school grouping doesn't promote, it's not that kind of intervention"* (434_4).

When asked about the GBL method, none of the teachers had heard of it. Some wondered if it was related to play: *"Hm, no. I've heard about through play, but not based on the garden"* (542_3), or like *"It's a teaching game"* (434_4), wondering if it was a hands-on thing or a game using images: *"But you use the garden?"*; *"But the image is real? (...) I'm imagining a game with the garden itself"* (434_4). The question that followed was if they have ever used; this was initially used as a category but was later discarded, as they all answered they had never used it and, therefore, never made use of the method intentionally. However, when asked their opinion of it, one teacher praised it: *"It's more practical, more experiential, our students are probably more urban, so it's also important that*

they get in contact with this part - knowing the origins of some foods, because most of them probably think they come from the supermarket and don't even imagine... (...) but for a lot of them it's first contact. And sometimes only", "[They] live in apartment buildings, don't have gardens, so I think it's very interesting" (564_1).

c. Theme: future

The final part of the interview consisted on the teachers' expectations for the future regarding the project, making room for them to make suggestions or add any concerns they had, based on what they had been told. Some concerned the current place of the garden: *"A more adequate space (...). We have the zone over there, (...) we call it the orchard. There is some dead space in there, I don't know if maybe changing the place" (308_P)*, adding that *"it's an okay space, it would only be a question of organizing" (308_P)*; others mentioned the taking care aspect of the garden: *"(...) whoever has the project in hands, or the vegetable garden, also has support. Then we have the watering aspect, the school breaks... I think there is a lot that could already be defined in the project, or not, that should be thought of" (564_1)*, and also having the students be responsible for the garden: *"Maybe even during lunchtime, make them responsible for- but watering during lunchtime would be inconvenient, wouldn't it, because it's not the best time. But giving them small tasks in those moments of responsibility would be nice!" (542_3).*

The outdoors, hands-on approach was also highlighted as beneficial: *"Yes, especially because it's more playful, they would like it a lot more, it's much more*

compelling. (...) Because they like (...) leaving the environment of those four walls. I think you can learn a lot outside the classroom as well” (669_2), especially for a school located in an urban area: “these city students here (...) don’t even know where potatoes come from”, “So, I think that in a city it’s even more enriching. You can build very positive things, lead them to interesting learnings” (434_4).

Some suggestions regarding what to do in the garden were also pointed out, such as involving the whole community: *“maybe also the solidarity aspect, which we also do a lot of work on here - maybe harvesting to give to families in need” (564_1), including the students’ families: “Involving the family, maybe - the grandparents, maybe some of them are already at home, are done with their labor activity” (564_1); and other schools: “I think initiatives like this are always enriching for the students, (...) and having more and more schools joining” (434_4), including primary schools: “I feel it’s very interesting to pull it back to the primary classes” (669_2).*

One teacher suggests using the garden to further explore the germination experiment, including what to do with the beans after: *“(...) and then, [the bean] ends up withering. Maybe if it happened in the garden it would be okay - in bigger quantities, we could then make soup or another dish, cook something with the food they will grown in the garden” (542_3).* Another suggestion specifically mentions lunchtime, with an example set from a previous experience: *“Usually, in the school canteens, there is something that I have always talked about and didn’t agree with as much, that is (...) blending the soup - I think the vegetables [should] be there, visibly - (...) we made the soup with whole vegteables” (308_P).*

Lastly, one teacher mentioned the need for projects to have continuity: *“Sometimes, projects begin and there is no support and continuity. What happens a lot is: we get excited, we join the projects, but then they stop at the beginning (...)”* (542_3), also mentioning the importance of support throughout, not just once at the start: *“we need that support, the training - even with the children, you can’t talk to them once, you need to speak more often”* (542_3).

d. Discussion

Teachers’ previous experiences denote a trend: primary schools - and I’m excluding preschool classes here - do not make a habit out of using school gardens, whether they have them (near or at the school itself) or not. There doesn’t seem to be just one reason why this happens, with teachers reporting various probable causes. As per the Portuguese Directorate-General for Education’s Curriculum Guidelines for Preschool Education, the curriculum is “developed with full articulation of learning, where spaces are managed flexibly, where children are called upon to actively participate in planning their learning, where the project method and other active methodologies are used routinely, where you can move around the learning space freely”⁽⁸¹⁾. I do wonder if preschool’s more flexible curriculum is the trick to it, with primary school teachers reporting lack of time due to extensive, time-consuming programmes: *“The programmes are very extensive, demanding and in terms of time (...) it’s very limited”* (434-4). School gardens, however, can make a variety of disciplines relevant through hands-on learning and connecting them to nature and the outdoors⁽⁴⁸⁾, being seen by the teachers as a complement and enrichment to the curriculum: *“(...) it’s more*

playful, they would like it a lot more, it's much more compelling. (...) I think you can learn a lot outside the classroom as well" (669_2) and *"You can build very positive things, lead them to interesting learnings"* (434_4).

Based on teachers' hands-on contact with gardens, it seems training and technical support are very important to the continuation of the project year-long (and beyond). It was not only brought up as a positive part of previous experiences, but also as something to be taken into account when designing the project, especially when there's a lack of knowledge on the topics. Partnering with interested parties, such as the MCC and Lipor, as they have previously worked together before, or any other company that shows interest - Maiambiente (a municipal public company) also seemed favorable to participate in it - could help solve issues related to material supply and technical support.

The responsibility of taking care of the garden should not fall only on the teachers, but also include the students; the organization aspect is fundamental and having an evenly distributed burden is key to it, as it is physical labor and time-consuming. Having the cooperation of a community, like including the families and other members, helps further lighten the burden of responsibility⁽⁸²⁾. It is also a way to extend the benefits of having a garden and its own life⁽⁸³⁾.

Most of what went well with the garden, based on previous experiences with school gardens, was down to food education, which is interestingly the goal of this project: to use the garden as a tool for food education. Reported growing interest in the vegetable garden and less refusal to eat vegetables were key elements of

success in the eyes of the teachers. Having outside help for whatever's needed, such as materials or training, was also pointed out.

Some activities already done by the primary school teachers, such as the germination experiment which seems to be a common experience to all grades, could easily be included in the school garden; even if, as one of the teachers mentioned, it would start off in-classroom and then move onto the garden - this would connect both places. Including the kitchen and the canteen for cooking-related activities, instead of using the classroom as was reported by one teacher, would also be interesting, involving even more of the school's space in the project.

The varied length of service of the teachers interviewed also made me think: precariousness in the teaching profession might be one of the reasons why projects have no longevity - unless the school, or the school grouping, is highly motivated to initiate and keep projects going, they fall flat. This is, in no way, to fully blame the lack of stability in the profession, but it is something to consider - although action needed is on a much bigger level, one unattainable in this circumstance.

Despite me thinking content adaptation would be the hardest part of the project, given common complaints regarding the school curriculum and its length, it seems teachers are very open to adapting it to topics related to the vegetable garden and make it full-circle. It seems time is actually the main thing stopping teachers from having more experimental learning, especially in the latter grades, which remains what I consider one of the biggest barriers to this project's success (especially regarding longevity). However, the teachers seemed willing to

integrate a variety of new ideas, so the adaptation of the contents wouldn't be an obstacle.

Regarding the GBL method, I expected most teachers not to have heard about it. It was interesting how two teachers first thought of it as a teaching game. It was also curious how the teacher that came from an eco-school, and was actively involved in a school garden, had never heard of the GBL method. Despite this, most teachers had in fact, unknowingly, used the method. It was mostly through the bean germination experiment - which seems transversal to the primary school classes as a way include hands-on, experimental learning -, and some directly using the garden - for example, harvesting produce from the school garden and then preparing and cooking it.

It's curious how there's a lack of nature-related projects and initiatives in urban schools, which naturally have less contact with nature, but explains growing interest in projects such as this one. One of the operational goals of the school's educational project is to promote a healthy and sustainable lifestyle - similar to one of the main goals of this project. Despite aiming for an increase of proposed activities based on sustainable goals and sustainability's three pillars (social, economical, environmental), the grouping, however, didn't have any activities planned for the 2023-2024 school year. When presenting this project, I've been shown nothing but interest from everyone, from the municipality, to the school grouping's director, to the coordinator and the teachers; while the reported lack of support for initiatives like this one was strange to hear, in reality, nothing is being done. Several factors positively impact the development of a school garden:

having strong support from senior management, making garden activities high-profile within the school, and ensuring that garden-related tasks are manageable for staff⁽⁸⁴⁾, while having support from stakeholders - staff, volunteers and wider community⁽⁸⁵⁾. Nevertheless, known obstacles do affect how a school garden is perceived: difficulty in recruiting or maintaining volunteers to take care of the garden, the pressure of added work, having an overcrowded timetable⁽⁸⁵⁾, the physical care of the garden, having to plan lessons centering the garden, and encouraging the community to engage with the garden⁽⁸⁴⁾. So, maybe this project is a right place, right time kind of opportunity to bring things around.

2. The students' perspectives

The students' perspectives and knowledge on vegetable gardens is essential to adapt the project's activities to their needs. As was established beforehand, this part entailed primary school students' representations of what a garden is in the form of drawings. It was decided that two students of each grade, for a total of eight, would come in for the focus group. Taking into account previously reported constraints, the discussion part of the focus group served as complement to the content analysis of the drawings; it was, however, important to understand their level of knowledge on vegetables and vegetable gardens and how they're part of their day-to-day in school.

The students were asked to draw what they feel belongs in a vegetable garden, with drawings being separated by grade, from 1st to 4th.

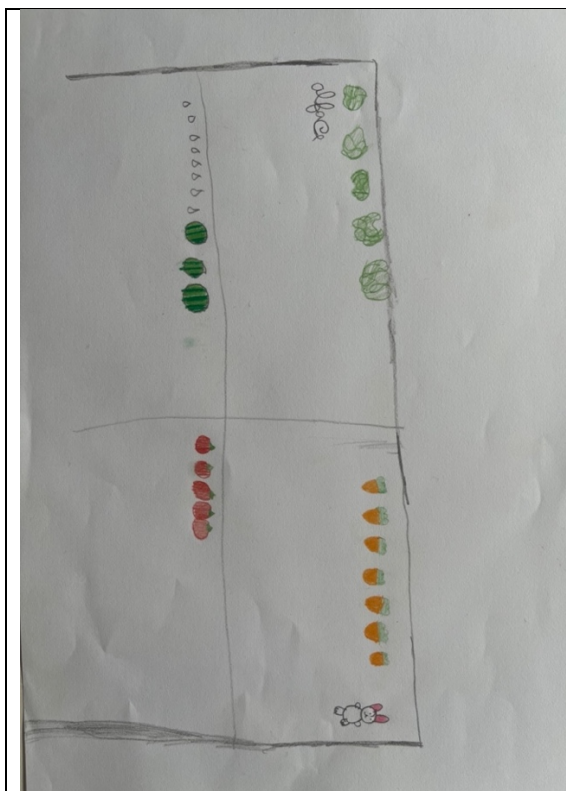
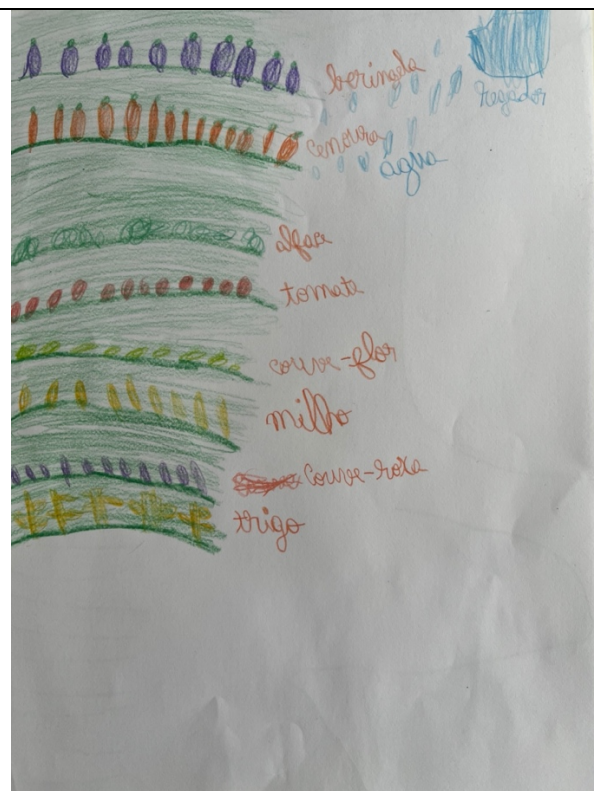
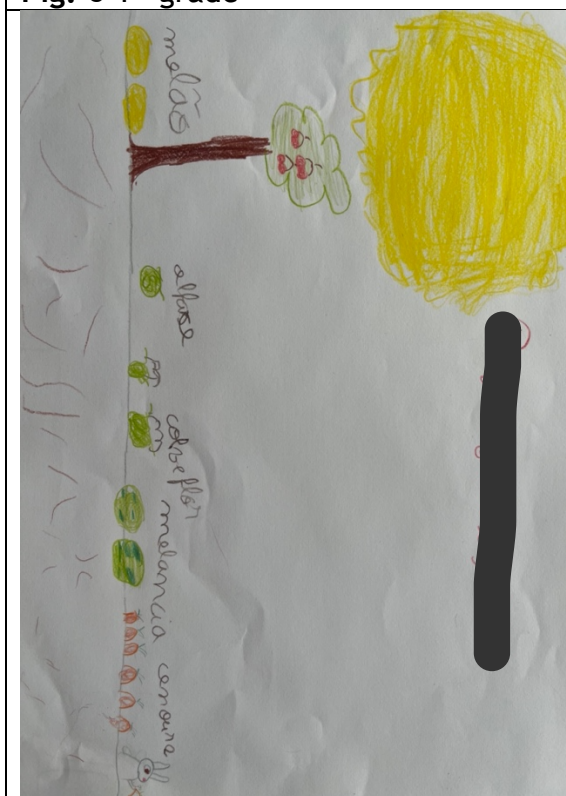
Fig. 6 1st gradeFig. 7 1st gradeFig. 8 2nd gradeFig. 9 2nd grade

Fig. 10 3rd gradeFig. 11 3rd gradeFig. 12 4th gradeFig. 13 4th grade

Table 3. The students' drawings

Most gardens are distributed throughout the available space in the sheet of paper, while some are set in a specific area. All students drew some form of terrain for the garden itself, with most drawings featuring either soil or grass. The sun is featured in most drawings, with some featuring the sky as well.

Most drawings feature at least 3 different types of vegetables, with some including fruits (watermelon, apple, cherry, melon, strawberry), either in the garden space or on a tree, and cereals (corn, wheat). Most drawings identify what kind of product is drawn, with either name plates or just the name itself near the product in question. Some drawings feature only a few of each product, others have multiple products in a row.

Some feature animals like rabbits and a bird. Two students drew a watering can near the garden; one other student drew a scarecrow.

The older the students are, the more detail there seems to be in the drawings. The younger ones have simplified versions of the request.

a. Discussion

While discussing what was in a vegetable garden, soil was mentioned as part of it. The bean experiment was, once more, brought up as an example; this time because the bean couldn't survive solely with cotton and water, having to be transplanted into soil to survive. Soil was highlighted as an important part of the garden, but not all students drew it; gardens are also usually associated with the colour green, which could justify the grass in some of the drawings.

When talking about what a garden needs to survive, the answers included mostly water and sun; this is well represented in most of the drawings, as they have both or either one of the other. This wasn't, however, originally included by all of them as, initially, the drawings didn't feature much besides the garden space - and some maintained that -, but as one student started expanding the contents of the drawing, others followed suit and started including things they thought were beautiful or realistic. This happened throughout the drawing time, as they often copied one another and ended up broadening the details of their own drawing; given this was a group setting, this was expected⁽⁸⁶⁻⁸⁸⁾.

Most of the vegetables drawn were mentioned along the conversation had beforehand, featuring either what they mentioned was part of a soup (carrot, cabbage) or a salad (lettuce, carrot, beet, tomato). Some would also mention one vegetable out loud, asking how to spell it or if it looks like it, which led to others including that same vegetable in their drawing. One student asked if they could draw corn in the garden, to which I replied they could if they felt like it belonged in a garden, and this mention, out loud, probably led to another including it in their own drawing.

As their preferences regarding fruit were also brought up, as well as talking about the school's orchard, most ended up drawing some kind of fruit (watermelon, melon, strawberry) in the garden, or in another space available, and some included a fruit tree (apple, cherry) as well. This was clearly influenced by the conversation we had; and while, at first sight, it seemed off-topic regarding the main theme, it's also true that the school's orchard is a place they frequently hang at - as it features seating underneath and near it - and they're familiar with

it. This could serve as example as to how to include the garden in their spare time, during the school day, and make it part of their routine and not just something that is used once in a while.

Rabbits were included in some drawings because they were brought into conversation, when mentioning why the school's garden wasn't being used (which was due to some moles and rats) - someone then told a story regarding rabbits in a garden and how they destroy it. Funnily, all the rabbits are near carrots or are supposed to be eating carrots, which could be due to common sense regarding what they eat.

When talking about their school garden, someone mentioned they found it funny that students had made a scarecrow for it; one student drew a scarecrow, possibly due to that conversation. Still on this topic, I mentioned scarecrows typically keep animals like birds away; this could be why one of the 1st grade students ended up drawing a bird, despite not featuring the scarecrow in itself.

Someone mentioned, along the conversation regarding planting things, that their sibling had planted sunflowers in their school; two students ended up drawing a sunflower.

Interestingly, the one student from the 4th grade that missed the conversation but agreed to draw anyway, featured some similar details (having the sun drawn in, having the vegetables in soil, having water represented) but not what was discussed during the conversation - like fruits or fruit trees, animals. Given most had some sort of contact with gardens, not necessarily the school's, in general, the drawings are realistic to what one would find in a vegetable garden.

While the drawing aspect was not a group project *per se* - as they were asked, individually, to draw a garden -, the conversation beforehand did influence most

of their drawings, in one detail or another; and while they were drawing as well, since there was praising for specific elements or the drawing as a whole - leading some of them to copy what they felt looked good. Beyond collecting data, this was an exchange of ideas and preferences and experiences, with students from different grades connecting and learning from one another.

The “Hor(t)a H” Project

1. Introduction

The Universal Declaration of Human Rights’ articles 25 and 26 state, respectively, that “everyone has the right to a standard of living adequate for the health and well-being of himself and of his family, including food, (...)” and that “everyone has the right to education”⁽⁸⁹⁾. The Convention on the Rights of the Child⁽⁹⁰⁾ mentions health, nutrition and the environment (briefly), namely:

- Article 17, which states the signed parties should “ensure that the child has access to information and material from a diversity of national and international sources, especially those aimed at the promotion of his or her social, spiritual and moral well-being and physical and mental health”;
- Article 24 states recognition for “the right of the child to the enjoyment of the highest attainable standard of health” and taking the appropriate measures, such as combatting “disease and malnutrition, (...) through the provision of adequate nutritious foods (...)” and ensuring “all segments of society (...) are informed, have access to education and are supported in the use of basic knowledge of child health and nutrition”;
- Article 27 states that parties should “recognize the right of every child to a standard of living adequate for the child’s physical, mental, spiritual, moral and social development”, and take the “appropriate measures to assist parents and others responsible for the child to implement this right and shall in case of need provide material assistance and support programmes, particularly with regard to nutrition, (...)”.

- Article 29, with the parties agreeing that children's education should be directed to "the development of respect for the natural environment".

Knowing how important good nutrition is to children's development, particularly during their first years of life, and how environmental sustainability should be ingrained in our day-to-day, vegetable gardens in schools emerge as the glue that binds health and sustainability together. They are, however, often abandoned - for a multitude of reasons - and not enjoyed to their full potential, by being, for example, a site for experimental learning and diversifying the students' learning opportunities. Most of the time they're at school is spent in-classroom, with little to no opportunity for a hands-on approach - and SGs are the perfect opportunity for it.

2. Goals

The purpose of this project is to explore the possibility of integrating school gardens in the school setting as a tool for food and nutrition education. As so, the initial goals set for this project are:

- (I) to promote the integration of vegetable gardens in schools as a tool for food and nutrition education;
- (II) to promote healthy and sustainable eating; and
- (III) increase contact with nature in urban centres.

Considering the informal observation during the visits to the school, the teachers' interviews and the focus group with the students, it seemed important to set further targets:

- make the school garden part of its day-to-day routine;
- encourage active participation on the behalf of the whole school community;
- develop the children's sense of responsibility, patience and care for nature.

3. Choosing a name

The chosen name is a play on words. The saying 'Hora H', in Portuguese, is said to have originated from the English term 'D Day'⁽⁷⁶⁾, whose own origin is from World War I - as the day the American offensive began. That was also the first time the saying '*Hora H*' was used in Portuguese, referring to the time of the beginning of the attack. Nowadays, it refers more often to a decisive moment in time. The word for vegetable garden, in Portuguese, is '*horta*'; thus, I took advantage of the similarity between the words '*hora*' (time) and '*horta*' (vegetable garden) and added the letter T, in parenthesis, to the '*Hora H*' expression. Thus, '*Hor(t)a H*' is meant to imply that a school garden, as a tool for food and nutrition education, has come at just the right time.

4. Human resources

Working with the school community means working with everyone that is part of the day-to-day running of the school. For this project in particular, any attempt at a school vegetable garden will only work if everyone is involved - the lack thereof was one of the reasons that led to the current state of the garden.

The human resources strives to include:

- a nutritionist;

- the school coordinator, the teachers, the operational assistants and the students of PS;
- and technical staff from the MCC, namely from the Education and Environment divisions.

The nutritionist will be responsible for presenting the project to the community (the school's and the involved actors in the MCC), collaborating on the proposed activities, and monitoring and evaluating the project.

5. Premises and materials

As the school already owns a SG, the project was supposed to make use of it; due to the various complaints and constraints, and at the suggestion of one of the teachers, it would be wise to move the site of the garden to a less challenging area. The new site should:

- have direct sunlight for, at least, 4 hours daily;
- be in a wind-free ou less windy area;
- be near a water point;
- be near where the tools will be kept;
- have enough space for future expansion of the cultivation area;
- have a socialization area.

One of the suggestions was to move it near the current SG, but further away from the stream, which does seem to comply to most of the characteristics needed for an optimal site for a garden; further inspection and approval would be down to the MCC.

The school's classrooms will also be utilized for training sessions, prepping other activities-related work and possible community gatherings concerning the project, as well as the kitchen and canteen spaces for cooking workshops.

As far as materials go, for the SG specifically, plant resources are the first thing to think about, as they are vital to the start of the project. Aside from making a list of the plants or produce to be used in the garden, fertilizer should also be considered. Since the school's dehydrator machine turns food waste into a dry substrate that can be used as fertilizer, outside sourcing won't be needed. The essential gardening tools:

- a hoe;
- a shovel;
- and buckets.

Other useful tools might include:

- a wheelbarrow;
- a pitchfork;
- pruning shears;
- a watering can;
- a hose;
- and planting containers.

Some of these might already exist in the school grounds and used, for example, by the gardener that takes care of the school yard, therefore could also be borrowed for the vegetable garden. These can then be kept in the school, not far away from the site of the SG.

6. Activity proposals

1. Project presentation

The project should be presented to the school community, starting with a more formal presentation to the MSG's Management, as well the PS1's coordinator. After talking and arranging for the best way to do it, the project should be presented to the fellow members of the community, starting with operational assistants, teachers and students, and then including the students' families.

If the school often uses newsletters or social networks to inform the school community, it could be an effective way to share the project. Face-to-face meetings seem unlikely, due to the number of students attending the school, but could also be considered.

2. Training sessions

Although seen as a necessity beforehand, the interviews with the teachers confirmed the need for proper, formal training on vegetable gardens as a whole. These will be essential to the continuity of the SG and should be done at the beginning of the school year. Another topic mentioned was composting, which will also be the subject of a training session.

a. The vegetable garden

These training sessions are focused on the vegetable garden itself, with the purpose of learning how to create and take care of a garden throughout the year.

The first two sessions are to be carried out by a gardening expert and the third one by the nutritionist responsible for the project; these are meant for the school staff (coordinator, teachers and operational assistants).

<u>Place:</u> Classroom; school garden <u>With:</u> Gardening expert	
Session #1 Creating a vegetable garden Duration: 90 minutes	Proposed session plan: • Learning about organic farming; • How to implement a school garden; • Planning a production calendar for the school year; • Practical session in the school garden.
Session #2 Maintaining a vegetable garden Duration: 60 minutes	Proposed session plan: • How to take care of the garden; • Good practices in sustainability; • Practical session in the school garden.
Session #3 Garden at home Duration: 60 minutes	Proposed session plan: • Creating your own garden at home; • An alternative: the hydroponic garden; • The vegetable garden starter kit; • Practical session.
*If open to, these training sessions could also involve the families, subject to availability	

<u>Place:</u> Classroom <u>With:</u> Nutritionist	
Session #4 The garden as a tool for food education Duration: 60 minutes	Proposed session plan: • Food and nutrition education and its tools; • The Garden-based Learning method; • Practical session: brainstorming ideas on how the garden can be integrated in the classroom.

b. Composting

The purpose of this session is to learn about composting and how it can be used as a complement to the school garden. The session will be carried out by an expert in composting and is meant for the school staff (coordinator, teachers, operational assistants).

<u>Place:</u> Classroom; school garden <u>With:</u> Composting expert	
Session #5 Composting Duration: 90 minutes	Proposed session plan: • Learning about composting; • Biowaste (food and green); • Practical session: in the school garden & using the dehydrator machine.
*If open to, these training sessions could also involve the families, subject to availability	

3. Exploring the school garden

This set of activities is meant to happen during the school year with the students. They're all related to the school garden and are meant as a complement to the school's curriculum and to be adapted to each grade's available time.

<u>Place:</u> School garden <u>With:</u> Gardening expert <u>When:</u> Beginning of the school year	
Session #1 Getting to know the school garden Duration: 45 minutes	Materials: Seeds; vegetables in the garden; gardening tools
	Treasure-hunt around the school garden with questions and tasks to solve to: • Get familiar with the SG; • Learn about different seeds and vegetables; • Identify gardening tools.

<u>Place:</u> Classroom; school garden <u>With:</u> Agriculture expert <u>When:</u> Throughout the school year (seasonally)	
Session #2 Matching seeds to vegetables Duration: 60 minutes	Materials: Seeds; images of vegetables; watering can; plant identification labels.
	Proposed session plan: • Identifying the seeds and matching to the image of a vegetable; • Learning about the importance of the vegetables in healthy eating, and how to use them; • Planting the seeds; • Watering the seeds; • Placing the identification label where the seeds were put.
*These sessions are to be repeated throughout the year: once during Autumn, once during Winter, once during Spring and once during Summer (june); the vegetables chosen should be seasonal.	
<u>Place:</u> Classroom; school garden <u>With:</u> Teachers <u>When:</u> Regularly (dependant on the development of the garden)	
Session #2 Plant life cycle Duration: 60 minutes	Materials: Computer and interactive panel available in the classroom; plants in the school garden
	Proposed sessioning plan: • Learning about the plant life cycle: growth, development and harvesting • Practical session: observing the plants in the school garden & drawing them

<u>Place:</u> Classroom; school kitchen/canteen <u>With:</u> Nutritionist	
Session #3 Food waste Duration: 60 minutes	Materials: Computer and interactive panel available in the classroom; seasonal vegetables; seasonal fruits; ingredients for the jam; ingredients for the soup; saucepan; pot; stove
	Proposed session planning: • Learning about food waste; • Food preservation as a way to fight waste; Proposed activities:

	#1 Making jam • Making jam using fruits & vegetables from the orchard and the garden; • Tasting session. #2 Making soup • Making soup using every part of the vegetables, from the school garden; • Tasting session.
*This session can be done for different groups (teachers & students; school staff), subject to availability	
Session #4 Composting Duration: 60 minutes	Materials: Proposed session planning: • Learning about composting; • Different ways to compost; • Practical session: using the dehydrator machine with waste from the kitchen.

Place: Classroom; school kitchen/canteen

With: Nutritionist; teachers

When: Beginning of the school year

Session #5 Production calendar Duration: 45 minutes (plus time dedicated to building the calendar)	Materials: Computer and interactive panel available in the classroom; laminated base for the calendar; paper sheets; colored pencils; laminating plastic; scissor; glue; velcro strips Proposed session planning: • Learning about what is produced in Portugal; • Learning about the Portuguese food production calendar. Proposed activity (to be done outside the session): • Creating a food production calendar for the school garden and orchard.
--	---

Place: Classroom; school kitchen/canteen

With: Nutritionist; teachers

When: Beginning of the school year

Session #5 Production calendar	Materials: Computer and interactive panel available in the classroom; laminated base for the calendar; paper sheets; colored
---	---

Duration: 45 minutes (plus time dedicated to building the calendar)	pencils; laminating plastic; scissor; glue; velcro strips
	Proposed session planning: • Learning about what is produced in Portugal; • Learning about the Portuguese food production calendar. Proposed activity (to be done outside the session): • Creating a food production calendar for the school garden and orchard.

4. Themed food fairs throughout the school year

Food fairs are a good way to involve the whole school community and an opportunity to have the SG right at the heart of it.

Throughout the school year, several commemorative dates are celebrated in schools all around the country. Based on the PS1's 2023-2024 annual plan of activities, World Food Day and Earth Day were two examples of it.

a. World Food Day

World Food Day falls annually on the 16th of october and the theme changes every year; this year's is 'Right to foods for a better life and a better future' and centers on Humanity's right to have diverse, nourishing, affordable, accessible and safe food and how billions of people around the world are unable to meet these standards. Transforming agrifood systems to mitigate inequalities; hence, the purpose of the activity is to learn about the food production system and its impacts while aiming for a more sustainable diet.

<u>Place:</u> Classroom; school kitchen <u>With:</u> Environmental & agriculture experts; Nutritionist <u>When:</u> 16 th of october	
Session #6 World Food Day Duration: 60 minutes	Materials: Computer and interactive panel available in the classroom; recycled paper; coloring pencils; ingredients for the sustainable meal; kitchenware
	Proposed session planning: • Learning about how food is produced; • Raise awareness about the impacts of the current food production system; • Learning about sustainable and healthy eating. • Practical session: drawing a sustainable meal (students); • Cooking workshop: making a sustainable meal.
*This session can be done for different groups (students; school staff; families), subject to availability	

b. Earth Day

Earth Day falls annually on the 22nd of april and while, like World Food Day, the themes change every year; next year's theme 'Our Power, Our Planet', centered on renewable energy. While not food-centered, it's an opportunity to talk about circular economy and how food can contribute to it.

<u>Place:</u> Classroom; school kitchen/canteen <u>With:</u> Environmental engineer; Nutritionist <u>When:</u> 22 nd of april	
Session #7 World Food Day Duration: 90 minutes	Materials: Computer and interactive panel available in the classroom; recycled paper; coloring pencils
	Proposed session planning: • Learning about circular economy;

	• Learning about 'From farm to fork'; • Practical session: Zero Waste cooking workshop, using vegetables from the school garden.
*This session can be done for different groups (students; school staff; families), subject to availability	

7. Monitoring and evaluating

All steps will be duly monitored throughout the school year, through data collection from varied methods: data collection through small group reunions with everyone involved - the school coordination, the operational assistants, the teachers, the children -, in order to hear what could be improved or rethought; direct observation of the state of the garden throughout the school year, as well as in the course of planned activities; and the use of photographic and graphic records - captured and drawn, respectively -, from throughout the school year, in the form of a manual about the school garden.

All the planned activities will be accompanied by the project's proposer, who will act as a mediator for any need that arises during the process, and cooperate with all those involved and thus including their contributions.

A final report containing all data collected mentioned above will serve as the project's final evaluation.

8. Possible entities and partnerships

The first entity approached to carry out the project was the Maia City Council - namely the Health Office and the Education Department - which readily agreed to take on the project. Maiambiente had also shown interest in collaborating with the project, and the collaboration of both entities is essential for the success of

the project - especially considering the starting point, and current state, of the school garden. Lipor had also previously collaborated on the school garden, and would also make a welcoming addition.

The MSG's Management and the PS1's Coordination, as well as the teachers, were also very keen on having the project go ahead; if successful, the project could be extended to the other primary school in the MSG and, later on, other primary schools under the tutelage of the MCC.

9. Timeline

As suggested by the school's coordinator at the end of the first visit to the school, projects should be presented by the end of the school year so it can be implemented the following one. This means by June or July, the school's community should be aware of the project, and, by September (the start of the school year), teachers, operational assistants and students should be presented with the project.

ACTIVITIES	SCHOOL YEAR											
	S	O	N	D	J	F	M	A	M	J	J	
Project presentation												
Establishing partnerships												
Planned sessions with the school staff												
Planned sessions with the students												
Planned sessions with the community												
Themed food fairs												
Project monitoring & implement. evaluation												
Final evaluation												

Table 4. The project's timeline throughout the school year

Expected outcomes and final assessments

Choosing to design a project for schools, as a Nutritionist, was not a hard choice, as I've always been compelled to do so. Since the food and nutrition education area isn't as explored as should be in Portugal, I did expect it to be a challenge. This project, to me, feels more like a guide to start building the idea of something I love that eventually will come to fruition, with much learnt along the way, but much to improve as well.

Although at first glance there wasn't a particular warm reception to the project at the school, I feel like it was just that: at first glance. Everyone involved showed up to support in whatever was needed and, during the interviews, the teachers were much more receptive than what I initially felt. The fact that the school already had a garden, albeit not used by the primary school teachers and students, was also a plus and helped feel like the project isn't out-of-context. There is grown interest in anything related to sustainability, in all its forms, and the MSG's educational project document specifically mentions it - making the project even more relevant and valued. Despite this, I do expect some challenges throw in the mix, as it does involve changes to the school's day-to-day dynamics. The challenge here is to hear and be heard, in a way that benefits everyone involved - and everyone's contributes were essential to the making of this project, for which I'll be forever thankful.

On a more positive note, I do feel like this openness to projects about healthy, sustainable eating and environmental sustainability, as well as the increasing appreciation for the nutritionist's role in schools, means that this is only the start

of something bigger - hopefully, that translates into a more active participation, professionally.

References

1. Lopes C, Torres D, Oliveira A, Severo M, Alarcão V, Guiomar S, et al. Inquérito Alimentar Nacional e de Atividade Física, IAN-AF 2015-2016: Relatório de resultados. 2017.
2. FAO. Global food losses and food waste - Extent, causes and prevention. Rome; 2011.
3. Kaza S, Yao LC, Bhada-Tata P, Woerden FV. What a Waste 2.0 - A Global Snapshot of Solid Waste Management to 2050. Washington, DC: World Bank; 2018.
4. Monteiro CA, Moubarac J-C, Cannon G, Ng SW, Popkin B. Ultra-processed products are becoming dominant in the global food system. Obesity Reviews. 2013; 14:21-28.
5. UN. The 17 Goals - Sustainable Development. 2024. Disponível em: <https://sdgs.un.org/goals>.
6. UN. Transforming our world: the 2030 Agenda for Sustainable Development. Paris: United Nations; 2016. Disponível em: <https://sdgs.un.org/2030agenda>.
7. PNPAS. Alimentação em meio escolar. 2014. Disponível em: <https://nutrimento.pt/alimentacao-escolar/alimentacao-em-meio-escolar/>.
8. Silva CEBd. Educação Alimentar na Escola: Metodologias de Abordagem nas Escolas do Ensino Básico. Universidade do Porto; 2003.
9. FAO. School Food and Nutrition. 2024. Disponível em: <https://www.fao.org/school-food/en/>.
10. Perez-Rodrigo C, Aranceta J. Nutrition education in schools: experiences and challenges. European Journal of Clinical Nutrition. 2003; 57:82-85.
11. Eugenio-Gozalbo M, Aragón L, Ortega-Cubero I. Gardens as Science Learning Contexts Across Educational Stages: Learning Assessment Based on Students' Graphic Representations. Frontiers in Psychology. 2020; 11
12. Conselho Nacional de Saúde. Agenda da Juventude para a Saúde 2030. Educação D-Gd. Lisboa; 2021. Disponível em: <https://cidadania.dge.mec.pt/sites/default/files/pdfs/agendajuventudesaudef.pdf>.
13. UN DESA. World Urbanization Prospect: the 2018 revision. 2018. Disponível em: <https://population.un.org/wup/>.
14. FAO. Leveraging Food Systems for Inclusive Rural Transformation. Rome; 2017. Disponível em: <http://www.fao.org/3/a-i7658e.pdf>.
15. International Energy Agency. Energy Technology Perspectives 2016: Towards sustainable urban energy systems. Paris; 2016. Disponível em: https://iea.blob.core.windows.net/assets/37fe1db9-5943-4288-82bf-13a0a0d74568/Energy_Technology_Perspectives_2016.pdf.
16. C40. Consumption-based GHG emissions of C40 Cities. 2018. Disponível em: https://cdn.locomotive.works/sites/5ab410c8a2f42204838f797e/content_entry5ab410fb74c4833febe6c81a/5ad4c0c274c4837def5d3b91/files/C40_GHGE-Report_040518.pdf?1540555698.
17. Lefebvre H. O Direito à Cidade. 5 ed.: Centauro; 2008.
18. Development WCoEa. Our Common Future. United Nations; 1987.
19. United Nations. Conference of the Parties (COP). 2024. Disponível em: <https://unfccc.int/process/bodies/supreme-bodies/conference-of-the-parties-cop>.
20. Flor A. Cronologia COP28: o que aconteceu em quase três décadas de cimeiras do clima? Público. 2023. Disponível em:

<https://www.publico.pt/2023/11/27/azul/noticia/cronologia-cop28-aconteceu-quase-tres-decadas-cimeiras-clima-2071532>.

21. United Nations. Calor mata mais de 175 mil pessoas por ano na região europeia, diz OMS. UN News; 2024. Disponível em: <https://news.un.org/pt/story/2024/08/1835566>.

22. United Nations. ONU faz chamado à ação para combater “epidemia de calor extremo”. UN News; 2024. Disponível em: <https://news.un.org/pt/story/2024/07/1835156>.

23. Sodiq A, Baloch A, Khan SA, Sezer N, Mahmoud S, Jama M, et al. Towards Modern Sustainable Cities: Review Of Sustainability Principles And Trends. Journal of Cleaner Production. 2019; 227:972-1001.

24. Macke J, Sarate JAR, Moschen SdA. Smart Sustainable Cities Evaluation And Sense Of Community. Journal of Cleaner Production. 2019; 239

25. D.R. I Série. Resolução do Conselho de Ministros n.º 112/2005. 112; 4057-59. Disponível em: <https://diariodarepublica.pt/dr/detalhe/resolucao-conselho-ministros/112-2005-233728>.

26. Agência Portuguesa do Ambiente. Estratégia Nacional de Desenvolvimento Sustentável ENDS 2015. Lisboa; 2008.

27. Caldas P, Ferreira DC, Dollery B, Marques RC. Municipal Sustainability Influence by European Union Investment Programs on the Portuguese Local Government. Sustainability. 2018; 10(4)

28. Galli A, Iha K, Pires SM, Mancini MS, Alves A, Zokai G, et al. Assessing the Ecological Footprint and biocapacity of Portuguese cities: Critical results for environmental awareness and local management. Cities. 2020; 96

29. Committee on the Rights of the Child. General Comment No.15 2013 on the right of the child to the enjoyment of the highest attainable standard of health (art. 24). 2013. Disponível em: <http://www.refworld.org/docid/51ef9e134.html>.

30. UN Economic and Social Council. CESCR General Comment No. 12: The Right to Adequate Food (Art. 11). UN Committee on Economic SaCRC. 1999. Disponível em: <https://www.refworld.org/legal/general/cescr/1999/en/87491>.

31. FAO, WHO. Sustainable healthy diets - Guiding principles. Rome; 2019.

32. FAO, WHO. Report of the Joint FAO/WHO Secretariat on the Conference. In: Second International Conference on Nutrition (ICN2); Rome. 2015. Disponível em: www.fao.org/3/i4436e/I4436E.pdf.

33. Torres I, Simovska V. Community participation in rural Ecuador’s school feeding programme: A health promoting school perspective. Health Education. 2017; 117:176-92.

34. Direção-Geral da Saúde. Programa Nacional de Saúde Escolar (PNSE|2015). Saúde Md. Lisboa: Direção-Geral da Saúde; 2015. 105.

35. Vilça T, Darlington E, Velasco MaJM, Martinis O, Masson J. SHE School Manual 2.0 - A Methodological Guidebook to become a health promoting school. Haderslev: Schools for Health in Europe Network Foundation (SHE); 2019. Disponível em: www.schoolsforhealth.org/resources/materials-and-tools/.

36. Linnell JD, Zidenberg-Cherr S, Briggs M, Scherr RE, Brian KM, Hillhouse C, et al. Using a Systematic Approach and Theoretical Framework to Design a Curriculum for the Shaping Healthy Choices Program. Journal of Nutrition Education and Behavior. 2016; 48(1):60-69.

37. D.R. II Série. Despacho n.º 6944-A/2018. 2018-07-19). Disponível em: <https://files.diariodarepublica.pt/2s/2018/07/138000001/0000200002.pdf>.

38. D.R. I Série. Decreto-Lei n.º 137/2012. 126; 2012-07-02): 3340-64. Disponível em: <https://files.diariodarepublica.pt/1s/2012/07/12600/0334003364.pdf>.
39. Contento IR. Nutrition education: linking research, theory, and practice. *Asia Pac J Clin Nutr*. 2008; 17:176-79.
40. Lujan HL, DiCarlo SE. Too much teaching, not enough learning: what is the solution? *Adv Physiol Educ*. 2006; 30:17-22.
41. Wurdinger SD. *Using Experiential Learning in the Classroom: Practical Ideas for All Educators*. Lanham: Rowman & Littlefield Education; 2005.
42. Scogin SC, Kruger CJ, Jekkals RE, Steinfeldt C. Learning by Experience in a Standardized Testing Culture: Investigation of a Middle School Experiential Learning Program. *Journal of Experiential Education*. 2017; 40(1):39-57.
43. Deslauriers L, McCarty LS, Miller K, Callaghana K, Kestin G. Measuring actual learning versus feeling of learning in response to being actively engaged in the classroom. *Proceedings of the National Academy of Sciences*. 2019; 116(39):19251-57.
44. Blair D. The Child in the Garden: An Evaluative Review of the Benefits of School Gardening. *Journal of Environmental Education*. 2009; 40(2):15-38.
45. Rye J, Selmer SJ, Pennington S, Vanhorn L, Fox S, Kane S. Elementary School Garden Programs Enhance Science Education for All Learners. *Teaching Exceptional Children* 2012; 44(6):58-65.
46. Duncan DW, Collins A, Fuhrman NE, Knauff DA, Berle DC. The Impacts of a School Garden Program on Urban Middle School Youth. *Journal of Agricultural Education*. 2016; 57(4):174-85.
47. Wolsey TD, Lapp D. School Gardens: Situating Students Within a Global Context. *The Journal of Education*. 2014; 194(3):53-60.
48. Williams DR, Dixon PS. Impact of Garden-Based Learning on Academic Outcomes in Schools: Synthesis of Research Between 1990 and 2010. *Review of Educational Research*. 2013; 83(2)
49. McAleese JD, Rankin LL. Garden-Based Nutrition Education Affects Fruit and Vegetable Consumption in Sixth-Grade Adolescents. *Journal of the American Dietetic Association*. 2007; 107(4):662-65.
50. Morris JL, Zidenberg-Cherr S. Garden-enhanced nutrition curriculum improves fourth-grade school children's knowledge of nutrition and preferences for some vegetables. *Journal of the American Dietetic Association*. 2002; 102(1):91-93.
51. Wells NM, Meyers BM, Todd LE, Jr. CRH, Barale K, Gaolach B, et al. The carry-over effects of school gardens on fruit and vegetable availability at home: A randomized controlled trial with low-income elementary schools. *Preventive Medicine*. 2018; 112:152-59.
52. Lever J. *The Indigenous Garden Project: Reflecting on Land-Based Education, Decolonizing and Garden Spaces in British Columbia's K-12 Education System*. Canada: University of Victoria; 2020.
53. Vinueza D, Lera L, Salinas J, González CG, Barrios L, Vio F. Evaluation of a Nutrition Intervention through a School-Based Food Garden to Improve Dietary Consumption, Habits and Practices in Children from the Third to Fifth Grade in Chile. *Food and Nutrition Sciences* 2016; 7(10):884-94.
54. Cotugna N, Manning CK, DiDomenico J. Impact of the Use of Produce Grown in an Elementary School Garden on Consumption of Vegetables at School Lunch. *Journal of Hunger & Environmental Nutrition*. 2012; 7(1)

55. Ratcliffe MM, Merrigan KA, Rogers BL, Goldberg JP. The Effects of School Garden Experiences on Middle School-Aged Students' Knowledge, Attitudes, and Behaviors Associated With Vegetable Consumption. *Health Promotion Practice*. 2011; 12(1):36-43.
56. Robinson CW, Zajicek JM. Growing minds: the effects of a one-year school garden program on six constructs of life skills of elementary school children. *HortTechnology*. 2005; 15(3):453-57.
57. Miller DL. The Seeds of Learning: Young Children Develop Important Skills Through Their Gardening Activities at a Midwestern Early Education Program. *Applied Environmental Education & Communication*. 2007; 6(1):49-66.
58. Ozer EJ. The Effects of School Gardens on Students and Schools: Conceptualization and Considerations for Maximizing Healthy Development. *Health Education & Behavior*. 2007; 34(6):846-63.
59. Aires L. Paradigma qualitativo e práticas de investigação educacional. Lisboa: Universidade Aberta; 2011.
60. Klein AZ. Um retorno ao básico: compreendendo os paradigmas de pesquisa e sua aplicação na pesquisa em administração. *Revista de Administração da UFSM* 2010; 2(2)
61. Burrell G, Morgan G. Sociological paradigms and organisational analysis: elements of the sociology of corporate life. London: Routledge; 1979.
62. Godoy AS. Introdução à Pesquisa Qualitativa e Suas Possibilidades. *Revista de Administração de Empresas*. 1995; 35(3):57-63.
63. Victora CG, DRK, Hassen MdNA. Pesquisa Qualitativa em Saúde - Uma introdução ao tema. Porto Alegre: Tomo Editorial; 2000.
64. Bardin L. Análise de conteúdo. Lisboa: Edições 70; 1977.
65. Sá-Silva JR, Almeida CDd, Guindani JF. Pesquisa documental: pistas teóricas e metodológicas. *Revista Brasileira de História & Ciências Sociais*. 2009; 1(1)
66. Kvale S. *InterViews: An Introduction to Qualitative Research Interviewing*. Sage Publications, Inc; 1994.
67. Bogdan R, Biklen S. *Investigação Qualitativa em Educação*. Porto: Porto Editora; 1994.
68. Quivy R, Campenhoudt LV. *Manual de investigação em ciências sociais*. Lisboa: Gradiva; 1998.
69. Ghiglione R, Matalon B. *O inquérito: teoria e prática*. Oeiras: Celta Editora; 2005.
70. Lüdtke M, André MEDA. *Pesquisa em educação: Abordagens qualitativas*. São Paulo: EPU; 1986.
71. Gillham B. *The research interview*. London: Continuum; 2000.
72. Amado J. *Manual de investigação qualitativa em educação* Coimbra: Imprensa da Universidade de Coimbra; 2014.
73. Dall'agnol CM, Magalhães AMMd, Mano GCdM, Olschowsky A, Silva FPd. A noção de tarefa nos grupos focais. *Revista Gaúcha de Enfermagem*. 2012; 33(1):186-90.
74. Veiga L, Gondim SnMG. A utilização de métodos qualitativos na Ciência Política e no Marketing Político. *Opinião Pública*. 2001; 7(1):1-15.
75. Jenks C. *Childhood*. Oxford: Routledge; 2005.
76. Marinheiro C. O significado da expressão «Dia D». 2011. Disponível em: <https://ciberduvidas.iscte-iul.pt/consultorio/perguntas/o-significado-da-expressao-dia-d/29917>.

77. Câmara Municipal da Maia. Visit Maia. 2023. Disponível em: https://visitmaia.pt/assets/files/VisitMaia_Apresentação_PT.pdf.
78. Agrupamento de Escolas da Maia. Projeto Educativo 2023-2026. 2024. Disponível em: https://www.aemaia.pt/images/ficheiros-em-artigos/agrupamento/PE_AEMaia_23_26.pdf.
79. Agrupamento de Escolas da Maia. EB/JI nº1 de Gueifães (Centro Escolar). 2014. Disponível em: <https://www.aemaia.pt/index.php/agrupamento/escolas/eb-n-1-de-gueifaes>.
80. UniPlanet. Maiambiente instala desidratador de resíduos alimentares, único no país. 2023. Disponível em: <https://www.theuniplanet.com/2023/04/maiambiente-instala-desidratador-de-residuos-alimentares-unico-no-pais/>.
81. Isabel Lopes da Silva, Liliana Marques, Lourdes Mata, Rosa M. Orientações Curriculares para a Educação Pré-Escolar. Direção-Geral da Educação (DGE) ed.; 2016.
82. Rowena Passy, Marian Morris, Frances Reed. Impact of school gardening on learning. National Foundation for Educational Research; 2010.
83. Julian Gonsalves, Danny Hunter, Nina Lauridsen. School gardens: multiple functions and multiple outcomes. In: Agrobiodiversity, School Gardens and Healthy Diets. 1 ed.: Earthscan from Routledge; 2020. p. 32.
84. Rowena Passy. School gardens: Teaching and learning outside the front door. Education 3-13. 2014; 42(1):23-38.
85. Heather Ohly, Sarah Gentry, Rachel Wigglesworth, Alison Bethel, Rebecca Lovell, Ruth Garside. A systematic review of the health and well-being impacts of school gardening: synthesis of quantitative and qualitative evidence. BMC Public Health. 2016; 16(286)
86. Anne Haas Dyson. Coach Bombay's kids learn to write: Children's appropriation of media material for school literacy. Research in the Teaching of English. 1999; 33(4):367-402.
87. Anne Haas Dyson. The social worlds of children learning in an urban primary school. New York: Teachers College Press; 1993.
88. Anne Haas Dyson. Writing children: Reinventing the development of childhood literacy. Berkeley, CA: National Center for the Study of Writing and Literacy; 1995. 44.
89. United Nations. Universal Declaration of Human Rights. 1948. Disponível em: <https://www.un.org/sites/un2.un.org/files/2021/03/udhr.pdf>.
90. United Nations. Convention on the Rights of the Child. 1989. Disponível em: <https://www.unicef.org/media/52626/file>.

Appendix

Appendix Index

Appendix I – Informed consent for the teachers	86
Appendix II – Informed consent for the students’ parents	87
Appendix III – Script for the semi-structured interview (teachers)	88
Appendix IV – Script for the focus group dynamic (students).....	89
Appendix V – The students’ drawings and its content analysis.....	83
Appendix VI – The teachers’ interviews and its content analysis.....	85

Appendix I – Informed consent for the teachers

CARTA DE ESCLARECIMENTO E CONSENTIMENTO INFORMADO Docentes

Foi convidado a participar num estudo de investigação científica conduzido por Ema Melim, no âmbito do projeto “Hor(t)a H - Para uma alimentação saudável e sustentável”. A sua participação é voluntária e anónima. Por favor, leia a informação abaixo antes de decidir se vai ou não participar na sessão. Se concordar, por favor assine no final.

Objetivo do estudo

O projeto tem como objetivos explorar a possibilidade da integração de hortas no meio escolar como ferramenta de educação alimentar, compreender a visão e os conhecimentos dos docentes sobre implementação de hortas, e conhecer as experiências dos alunos com hortas em meios urbanos. A informação recolhida será usada para a elaboração de um projeto de mestrado no âmbito do Mestrado em Educação Alimentar da Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto.

Procedimentos

Se aceitar ser voluntário neste projeto, será convidado a fazer uma entrevista semi-estruturada sobre o tema do projeto: hortas pedagógicas. As entrevistas serão gravadas e serão tomadas notas escritas. As gravações serão utilizadas apenas para efeitos de análise da perceção dos participantes e servirão apenas como material informativo sem referências a uma pessoa específica.

Tratamento de dados e confidencialidade

O tratamento dos dados obtidos garante o anonimato dos participantes, nunca sendo feito qualquer tipo de uso que possa revelar a identidade dos participantes. Nenhum dado será tornado público sem o prévio consentimento dos interessados.

Recusa em participar

É inteiramente livre de participar, ou não, neste estudo. Se se voluntariar para participar no estudo, é livre de se retirar a qualquer momento sem consequências de qualquer tipo. Também é livre de recusar responder a qualquer pergunta ou de participar numa atividade específica.

Riscos potenciais

O estudo não envolve qualquer risco potencial, quer sejam sociais, legais ou financeiros.

Investigadores

Se tiver qualquer questão ou apreensão com este estudo, poderá contactar as seguintes pessoas:

- Ema Melim, estudante do Mestrado em Educação Alimentar da Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, através do e-mail up202003621@up.pt

Compreendo a informação acima descrita. As minhas questões foram respondidas de forma satisfatória e concordo em participar neste estudo. Foi-me dada uma cópia deste protocolo.

(Nome)

(Assinatura)

(Data)

Appendix II – Informed consent for the students' parents

CARTA DE ESCLARECIMENTO E CONSENTIMENTO INFORMADO Encarregados de educação

O seu educando foi convidado a participar num estudo de investigação científica conduzido por Ema Melim, no âmbito do projeto "Hor(t)a H - Para uma alimentação saudável e sustentável". A sua participação é voluntária e anónima. Por favor, leia a informação abaixo antes de decidir se o seu educando vai ou não participar na sessão. Se concordar, por favor assine no final.

Objetivo do estudo

O projeto tem como objetivos explorar a possibilidade da integração de hortas no meio escolar como ferramenta de educação alimentar, compreender a visão e os conhecimentos dos docentes sobre implementação de hortas, e conhecer as experiências dos alunos com hortas em meios urbanos. A informação recolhida será usada para a elaboração de um projeto de mestrado no âmbito do Mestrado em Educação Alimentar da Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto.

Procedimentos

Se aceitar que o seu educando seja voluntário neste projeto, será convidado a fazer uma representação, através de plasticina, do que entende sobre o tema do projeto (hortas pedagógicas). Serão tiradas fotografias aos resultados finais, que serão utilizadas apenas em contexto de análise da perceção dos participantes e servirão apenas como material informativo sem referências a uma pessoa específica.

Tratamento de dados e confidencialidade

O tratamento dos dados obtidos garante o anonimato dos participantes, nunca sendo feito qualquer tipo de uso que possa revelar a identidade dos participantes. Nenhum dado será tornado público sem o prévio consentimento dos interessados.

Recusa em participar

É inteiramente livre de participar, ou não, neste estudo. Se se voluntariar para participar no estudo, é livre de se retirar a qualquer momento sem consequências de qualquer tipo. Também é livre de recusar responder a qualquer pergunta ou de participar numa atividade específica.

Riscos potenciais

O estudo não envolve qualquer risco potencial, quer sejam sociais, legais ou financeiros.

Investigadores

Se tiver qualquer questão ou apreensão com este estudo, poderá contactar as seguintes pessoas:

- Ema Melim, estudante do Mestrado em Educação Alimentar da Faculdade de Ciências da Nutrição e Alimentação da Universidade do Porto, através do e-mail up202003621@up.pt

Compreendo a informação acima descrita. As minhas questões foram respondidas de forma satisfatória e concordo que o meu educando participe neste estudo. Foi-me dada uma cópia deste protocolo.

(Nome)

(Assinatura)

(Data)

Appendix III – Script for the semi-structured interview (teachers)

ENTREVISTA SEMI-ESTRUTURADA

Guião #2 Docentes

— *Que momentos existem para lecionar temas relacionados com a alimentação em sala de aula (e fora dela, também), com a horta como ferramenta pedagógica?*

BLOCOS	Objetivo do bloco	Questões orientadoras	Perguntas de recurso e de aferição
1 Legitimação da entrevista	Explicar a situação Criar ambiente propício à entrevista	- Agradecer a disponibilidade; - Informar sobre o uso do gravador; - Explicar o problema, o objetivo e os benefícios do estudo - Colocar o entrevistado na situação de colaborador; - Garantir confidencialidade dos dados; - Explicar o procedimento.	
2 História das experiências dos docentes com hortas pedagógicas	Obter dados sobre experiências prévias dos docentes no contacto com hortas pedagógicas	Fale sobre experiências prévias com hortas pedagógicas	- Aconteceram em contexto de sala de aula? - Houve um contacto prático com a horta? - O que correu bem? - O que correu mal?
3 A integração da horta no dia-a-dia escolar		Como poderia a horta pedagógica ser integrada nas aulas	- Que tempo existe para dispendir em aulas práticas na horta? - Que conteúdos poderiam ser adaptados à sua inclusão?
4 O <i>garden-based learning</i> (GBL) como ferramenta pedagógica		Que importância dá ao ensino GBL (<i>garden-based learning</i>)?	- Conhece o método GBL? - Já utilizou o método GBL? - Qual a sua opinião sobre o método GBL?
5 Síntese e reflexão sobre a entrevista; Agradecimentos	Perceber o sentido que o entrevistado dá à situação da entrevista	O que pensa dos objetivos do projeto; que contributo pode dar ao projeto	Gostaria de acrescentar mais alguma coisa?

Appendix IV – Script for the focus group dynamic (students)

ATIVIDADE DINÂMICA (ESTILO GRUPO FOCAL)

Guião #1 Alunos

— *O que sabem sobre hortas?*

BLOCOS	Objetivo do bloco	Questões orientadoras	Perguntas de recurso e de aferição
1	Explicar a situação Criar ambiente propício à tarefa	- Agradecer a disponibilidade; - Explicar o objetivo e os benefícios do projeto; - Colocar o entrevistado à vontade; - Garantir confidencialidade dos dados; - Explicar o processo.	
2	Perceber o que os alunos conhecem sobre hortas	O que é uma horta?	O que é expectável encontrar numa horta? Quem cuida da horta? Gostam dos alimentos encontrados na horta? O que gostariam de encontrar na horta? O que é preciso para a horta crescer forte e saudável?

Appendix V – The teachers' interviews and its content analysis

Category	Sub-category	Answers
Past:		
Experiences with school gardens	— Previous experiences	“Eh, so, in the various schools I’ve been to, we’ve had projects, eh, related to building vegetable gardens (clears throat).” (308)
		“Yes, exactly. There you go. And, so, it was something that I, as long as there’s space and the chance to, use it. A lot of the times that space doesn’t exist and we try to do it, eh, inside the classroom, eh, this type of work because I think that... the children, first of all, like it, adore it. In fact, we had that experience here, hm, two years in a row - only this year we didn’t - eh, and then it was fun because everything we harvested from the garden we used to make salads, and to make soup, right.” (308)
		“I’ve never had.” (564)
		“I never had. Eh, I know that, in fact, we had a garden here and- and I’ve seen how the project and the space were developed, and I noticed some activities that happened, but never- I never had any type of contact, never worked on it, never been involved.” (564)
		“Ok. We’ve never worked in the gardens themselves.” (669)
		“The schools I’ve been to didn’t have a vegetable garden. Eh, last year’s school, there was one in the school grouping. The school, as it was a primary school, didn’t have one.” (669)
		“(…) but in a garden itself, no.” (669)
		“There was- the school grouping had a vegetable garden, yes, yes. For some subjects, the teachers would accompany the students to, eh- (...) Work.” (669)
		“With the school garden, in here, I don’t think I’ve had any experience. There’s one for the preschool classes, right, but we haven’t been working directly with- with the preschool classes on the garden.” (542)
		“It has always been- in here it’s always the preschool classes.” (542)
		“Yes, I had. I come from a school grouping that was very focused towards the outside - it was an eco-school and- and part of it, one area that was worked on was precisely the vegetable garden. (...) So it was very, very positive. A very nice experience.” (434)

– Hands-on contact		“And also, to this - we’re in an environment- so, I come from Viana do Castelo but it was a school in a rural area.” (434)
		“I have a personal experience, since I had Article 79 - which is the one... without teaching component - and I created a vegetable garden in the school I was at. I was the one who organized the garden, eh, for the primary and the preschool classes.” (308)
		“Right, at the time we had training with Lipor, as well, hm, to, well, learn a bit (the school bell rings at the same time) about the dynamic, what type of products we can, eh, plant or sow at certain times of the year, and, and, we tried to (the school bell stops ringing) manage the situation like that. Yeah, and they participated in the whole process: from preparing the dirt, to sowing, sometimes we did the germination in the classroom and then, eh, we replanted into the garden. So, they then, eh, did the whole watering process, removing leaves- eh, weeds.” (308)
		“With all those steps. So, then, eh- some crops were done- during Springtime, we placed others... Yeah, and, eh, and they participated in- in the harvest as well, in the food preparation: salads, eh, vegetables, all of that.” (308)
		“Yes, yes! I come from a village, so my parents own vegetable gardens and yes, yes.” (564)
		“Eh, everytime I worked with them we used pots - we’d work on the topic but using pots. Last year- in here, this year, I didn’t do anything;” (669)
		“Vegetable gardens, well, I go the village and have some contact, through my parents - I help sometimes. So, yeah, I know some things, not much.” (542)
		“Every class, from preschool through 4th grade, was responsible for a little piece of the garden, which they cultivated, well, products, and then we had a very strong connection with the community and the family - the grandparents had a day to help sow, plant, take care of our spot, eh- and then, eh, in the canteen, until harvest time, right, and it was- was from farm to table.” (434)

	• What went well	“And we did a very interesting job in a food education level, eh, because I think the children, when they actively enter and participate in these processes, it’s a lot easier to then we get to that point where we have to taste, because it’s something we produced, something we... that we treated and, eh, it was actually interesting, eh...” (308)
		“And, eh, I know children always find it harder to eat, eh, when the. When they see the vegetables there; and I thought it was funny that, on that day, they were so excited and looked at it, just, eh, proud to say “look, we’re eating our own cabages”, eh, it was really fun beacsue they ate-” (308)
		“Yeah, and they liked that experiment a lot and usually, well, I think it has- it makes sense to have vegetable gardens when there is space and conditions for it. So, hm... So yeah, personally, I think it makes sense and they also like it. They talked a lot about the garden this year, saying “what about the garden, teacher? Aren’t we using it?”.” (308)
		“Eh... I think, at the time... I think we had help from both of them. Because the Municipality has a protocol with Lipor- (...) And work in partnership and, eh, even the seeds part, the Municipality arranged it for us.” (308)
		“The compost- the compostor I don’t know. Eh, but I think, at the time, Lipor was also- they also did that training.” (308)
	• Difficulties	“Yeah, but in the meantime other issues arose and, eh, the space became inadequate because, well, for a number of reasons - amongst them, the animals (laughs)...” (308)
		“Predators, pests, and so. This year we didn’t go forward with it.” (308)
		“But we always have that inconvenience. We have the stream next to it (laughs).” (308)
	• Ativities**	“They were.” (308)
		“Yeah. We made the soup in the classroom with a... we had a-” (308)
		“A stove top.” (308)
		“And we did it in the classroom and there was also a point where we also made a two-toned soup. I don’t know if you know about it.” (308)

		“Yeah. One only has pumpkin and carrot and the other a dark vegetable.” (308)
		“And, eh, when serving on a plate, they don’t mix.” (308)
		“Yeah. And we also composting, I didn’t talk about it, but we were composting.” (308)
		“No, since at the time- I don’t know if it existed already.” (308)
		“It is. The first year I arrived (...), the first year I don’t think we had it yet. We composted - the first and second years - we composted.” (308)
		“We do a bit of it, during experimental sciences, with germination, etc, eh-” (564)
		“(…) eh, but, for example, in last year’s school we did the bean experiment, which was then transplated to a bigger pot for them to see; we also put lettuces, it was more leaf-based but everything in pots. We’d compare them, so the students could have the responsibility; (...)” (669)
School career**	— Length of service**	“Because they also- even the bean experiment, we do it, well, on a mini- it’s the experiment with the bean plant inside the ?(classroom)?” (542)
		“(…) this is the 3rd year I’m here (...)” (308)
		“I work here- it’s my seventh year, this year was my seventh.” (564)
		“I don’t think so.” (564)
		“Yes.” (564)
		“Yes!... I’ve been here for 23 years.” (542)
		“I come from another- (laughs) ?(generation)?” (542)
		“Yes.” (564)
Present:		“Eh, three years ago. So, I come from Viana do Castelo - this school grouping is in Viana do Castelo.” (434)
		“Here- this class, from 2 nd to 4 th grade.” (434)
The garden in the school’s day-to-day	— Content adaptation	“We also learn a lot with- beside the food part, because, for example, the growth-” (308)
		“We follow the plants’ growth cycle, yeah, eh. Then it’s their characteristics...” (308)

		“And you can do a lot, watch, for example, the assortment of seeds we put in the garden - we also did that -, the- what type of seeds they are, the colour, the size... Yeah, we did a variety of things that, deep down, the garden is interdisciplinary, you can work on practically all areas: personal social development, mathematics, language, <u>everything.</u>” (308)
		“Right, besides the whole dynamic, of activities related to the land cultivation, with the sustainable production of- of food, with- we could then also use it for all the other subjects. For mathematics, arts, environmental studies, for, eh- everything- Portuguese- so all subjects it would be, in fact- I think it’s a very broad and interdisciplinary project.” (564)
		“Yes.” (564)
		“Yes, of course! Because, imagine, initially, probably, we’d have to set the place - if it isn’t that one - or we could, for example, relate to mathematics - measuring, calculating areas, the length, etc; eh, the needed space for each product, there is a lot... Then, the precautions needed, eh, diet as well, right, talking about integrating vegetables and fruits in our diet - which is, also, a- a big battle for us -, eh, writing, ehm. Observing in loco is extremely important, the various growth stages, the living beings’ growth phases - not just plants in this case, because the garden will also attract (laughs softly) all the other part, ehm, of the fauna-” (564)
		“The ecosystem. So, there would always- certainly it would be very easy to integrate, to then go out there and work. And physical education as well, right.” (564)
		“I think that, at any point of the program, for every subject, we could always integrate it. Story building, eh, I don’t know... the scarecrows... There’s so much we could do to link to the vegetable garden.” (564)
		“it was worked on during Environmental Studies class - along with plants’ growth,

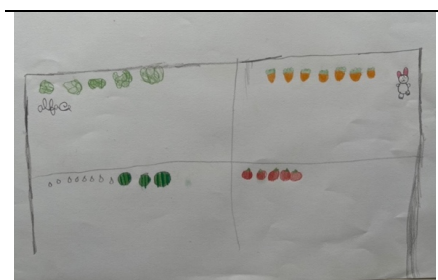
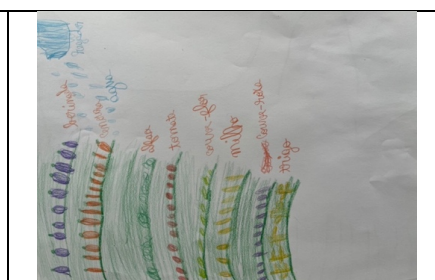
		the light - and it was more like that (...).” (669)
		“In Environmental Studies, you can do that perfectly, yes. Even for Portuguese, eh, when we’re working on texts, eh, I believe so, you can- can conciliate.” (669)
		“I think in Environmental Studies, right, we talk about Nature, the fo- we have to approach diet, Nature... I feel like it would fit, to substantiate it, right.” (542)
		“Ah, it perfectly can! The contents we cover, the domains in the Environmental- it’s transversal. Even the three main subjects... It’s perfectly framable and in every area.” (434)
	– Workload/duration	“Yeah, that process happened throughout the school year.” (308) “Exactly.” (308)
	– Constraints**	“The school, as it was a primary school, didn’t have one.” (669)
		“Since we were the primary classes, the schools aren’t very... (...) Prepared, yes.” (669)
		“But you know, the thing is, I don’t have much knowledge on it.” (669)
		“Right, time is... It’s what holds us back a bit. But some time during the week would be possible; a little, but we would manage it.” (542)
		“Never. This school grouping doesn’t- doesn’t- doesn’t promote, it’s not that kind of intervention.” (434)
		“Well, there... The programmes are very extensive, demanding, right, and... in terms of time, timing, it’s very limited, right. It doesn’t mean you can’t develop projects in that topic, but programmes do take up a lot, a lot of time.” (434)
	Garden-based Learning (GBL)	– Knowledge of the method
		“I don’t, actually. Don’t know about it.” (308)
		“Yes, yes, right.” (308)
		“No.” (564)
		“No, no.” (564)
		“No, no.” (669)
		“No, no.” (669)
		“Yes, but the term I’ve never-” (669)
		“No, no.” (669)
		“Hm, no. I’ve heard about through play, but not based on the garden.” (542)
		“No.” (542)

		"No." (542)
		"No!" (434)
		"No, but I will take note!" (434)
		"It's a teaching game." (434)
		"But you use the garden?" (434)
		"But the images- the image is real? Or is it... I'm imagining a game with the garden itself." (434)
		"They're planting, sowing, harvesting... (...) Ok, ok, ok." (434)
		"Yes, yes." (434)
	Opinion on the method	"The garden?" (564)
		"Of course, of course." (564)
		"Yes, of course. It's more practical, more experiential, our students are probably more urban, so it's also important that they get in contact with this part - knowing the origins of some foods, because most of them probably think they come from the supermarket and- and- and don't even imagine... (...) but for them, some- for a lot of them it's first contact. And sometimes only." (564)
		"They're urban, live in apartment buildings, don't have gardens, so I think it's very interesting." (564)
	Future:	
	Expercations for the future — Suggestions for the future	"Usually, in the school canteens, there is something that I have always talked about and didn't agree with as much, that is, for example, blending the soup - I think, for me, soups should, the vegetables be there, eh, visibly - and, actually, one of the interesting things there is that we made the soup with whole vegteables." (308)
		"(hesitates) I don't know, maybe check out the space. A more adequate space, I don't know. We have the zone over there, the, eh- we call it the orchard. There is some dead space in there, I don't know if maybe changing the place. Instead of the one over there." (308)
		"No, no." (308)
		"Right, I don't know as well. There's trees there, it's not exactly..." (308)
		"So, I don't know, but the place should be better looked at. It's beautiful!" (308)
		"And it's an okay space, it would only be a question of organizing." (308)

		“Ehm, maybe also the solidarity aspect, which we also do a lot of work on here - maybe harvesting to give to families in need, I don’t know how that would then be, eh, that part, but-” (564) “No, eh- the only thing that worries me, actually, would be helping with the maintenance- I don’t know if then- and because- even though I have contact with vegetable gardens, in this moment, I couldn’t imagine doing- initiating the practical aspect, right.” (564) “Right, more technical - since the garden would be organic, we wouldn’t use insecticides, herbicides, etc. How to fight - or if we’d have to fight, in any way, pests or, I don’t know, can’t imagine it. Ehm, products as well. Materials and products are something that, in schools, is also hard to have access to - how would we have access to them; if we had, then, technical support. Even though I think that (the classroom door opens) family should be involved- (the teachers who opened the door are talking) involve the family-” (564) “Envolving the family, maybe - the grandparents, maybe (the classroom door closes) some of them are already at home, are done with their labor activity and, so... I don’t know. But yes, these are concerns I have and that I feel it’s important that they were already defined and clear in the project. So, whoever has - if all the teachers, if all the classes, only some, I don’t know - but whoever has the project in hands, or the vegetable garden, also has support. Then we have, I don’t know, the watering aspect, the school breaks... I think there is- there is a lot that could already be defined in the project, or not, I don’t know, that should be thought of.” (564) “Yes, especially because it’s more playful, they would like it a lot more (laughs softly), it’s much more compelling. Especially leaving the classroom, it would be great! Because they like doing so- leaving the environment of those four walls. Ehm, I think you can learn a lot outside the
--	--	--

	classroom as well; sometimes, “Oh, no!”, but you learn a lot, yes.” (669)
	“No, I feel it’s very interesting to pull it back to the primary classes, yes, it’s fundamental.” (669)
	“... and then, right, it ends up withering. Maybe if it happened in the garden it would be okay - in bigger quantities, we could then make soup or another dish, cook something with the food they will grown in the garden.” (542)
	“Maybe even during lunchtime, make them responsible for- but watering during lunchtime would be inconvenient, wouldn’t it, because it’s not the best time. But giving them small tasks in those moments of responsibility would be nice!” (542)
	“Sometimes, projects begin and there is no support and continuity. What happens a lot is: we even have- we get excited, right, we join the projects, but then they stop at the beginning and there’s no continuity... So yeah, we need that support, the training - even with the children, you can’t talk to them once, you need to speak more often. Bring new proposals in-” (542)
	“Right, right. Because, often, projects are cool and we get excited, they begin and then- they fall at the last hurdle.” (542)
	“Right. It’s bringing new ideas in, and- tease us, the children and the teachers. I think it’s important to bring new ideas - and sharing, I think it’ very important.” (542)
	“No, I... I think initiatives like this are always enriching for the students, and I think the raising awareness among schools, and having more and more schools joining, right.” (434)
	“So, eh, the students, that community is one that is already in touch with animals, plants, the land; while these city students here have no idea- don’t even know where potatoes come from, right.” (434)
	“So, I think that, eh, in a city it’s even more enriching. You can build very positive things, very- lead them to interesting learnings, of course.” (434)

Appendix V – The students' drawings and its content analysis

	
1. Garden divided in 4 parts: one with 5 lettuces, one with 7 carrots, one with 3 watermelons (and 8 seeds), and one with 5 tomatoes. There's a rabbit near the carrots	2. Garden in a green space, with 8 different rows of planted elements: 10 eggplants, 14 carrots, 9 lettuces, 12 tomatoes, 9 cauliflowers, 9 ears of corn, 11 red cabbages and 6(?) spikes of wheat. There's a watering can with water falling over the garden
	
3. Garden apparently on soil with 2 melons, a cherry tree with 3 cherries, 1 lettuce, 2 cauliflowers, 2 watermelons and 6 carrots. There's a rabbit near the carrots, eating one. The sun is on the top left corner	4. Garden on one half of the paper sheet, with 2 tomatoes, 3 beets and 9 carrots. At the center, a sunflower with the sun on top. On the other half, a scarecrow placed in a green area
	
5. Garden drawn on soil and marked with a plaque, with: 1 ear of corn, 1 tomato, 2 lettuce and 4 eggplants. On the left side, an apple tree with a bird on top. On the right side, 3 little trees. There's a sky on top, with a cloud at the center	6. Garden with 2 beets, 3 lettuces, 3 carrots, 3 (red) cabbages, 3 tomatoes and 3 ears of corn. On the left side of the garden, a wall(?) with a rabbit on top and a carrot near it. Sun drawn on the left top part, with the sky and a cloud next to it
	
7. Garden drawn on green area, with 1 watermelon, 3 lettuces and 3 carrots. On the left side, an apple tree with 6 apples and a small	8. Garden surrounded by a fence, with a gate, and drawn on soil, with the vegetables in rows and identified by plaques. There's 4 lettuces, 4

flower next to it; on the right side, and above the garden, a rabbit on top of the carrots, a box with 3 strawberries, a box with 3 tomatoes and a sunflower. The sun is at the center, on top of the garden	tomatoes and 4 carrots. There's a watering can inside the garden space, with a single drop of water falling off it. At the center, and on top of the garden, the sun, with the sky drawn as well
--	--

The garden	Planted	Vegetables	Lettuce (1, 2, 3, 5, 6, 7, 8)
			Carrot (1, 2, 3, 4, 6, 7, 8)
			Tomato (1, 2, 4, 5, 6, 7, 8)
			Cauliflower (2, 3)
			Eggplant (2, 5)
			Red cabbage (2, 6)
			Beet (4, 6)
		Fruit	Watermelon (1, 3, 7)
			Melon (3)
			Strawberry (7)
		Cereals	Corn (2, 5, 6)
			Wheat (2)
		Seeds (1)	
	Garden care	Water	Watering can (2, 8)
		Sunlight	Sun (3, 4, 6, 7, 8)
		Protection	Scarecrow (4)
Surrounding Nature	Land type	Green (2, 7)	
		Soil (3, 5, 8)	
	Animals	Rabbit (1, 3, 6, 7)	
		Bird (5)	
	Trees	Cherry tree (3)	
		Apple tree (5, 7)	
	Celestial elements	Sky (5, 6, 8)	
		Clouds (5, 6)	
	Flowers	Sunflower (4, 7)	
		Flower (7)	
Other elements	Garden accessories	Identifying plaques (5, 7, 8)	
		Boxes (7)	
	Barriers	Wall (6)	
		Fence (8)	

“Hor(t)a H” – For a healthy and sustainable diet

Ema Melim

SEDE ADMINISTRATIVA FACULDADE DE CIÊNCIAS DA NUTRIÇÃO E ALIMENTAÇÃO
FACULDADE DE PSICOLOGIA E DE CIÊNCIAS DA EDUCAÇÃO

