

Use of eco-art education in supporting the establishment  
of sustainability competencies in basic education: An  
interventionist case study

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## **ABSTRACT**

Recent socioecological approaches in Environmental Education acknowledge the complexity of “real-world situations”, which include environmental problems. One response to the challenge of enabling people to develop sustainability is the key competencies in sustainability framework. It can be faced as a guide to planning Environmental Education actions. On the other side, art practices hold potential to expand learning in varied ways. Art can offer the strategies employed in learning processes directed to sustainability, constituting the field of eco-art education.

This research aims to investigate the integration of the visions of the key competencies in sustainability and the eco-art education in an Environmental Education project at high school level. Horta & Gastronomia (Vegetable Garden & Gastronomy) is an extra-curricular activity which happens every year at Irmão Jaime Biazus high school in Porto Alegre, Brazil. It addresses food security and sustainability associating the garden, the kitchen and exploration of sustainability issues using eco-art strategies. Action research approach is used, defining two research cycles to explore the effectiveness of eco-art for the development of key competencies in sustainability. The first cycle focuses on the eco-art activities applied in Horta & Gastronomia (2017 group) while the second cycle deals with a post-project intervention designed to observe indicators of the sustainability competencies and further explore eco-art strategies.

This study adds to the field of sustainability competencies by exploring teaching strategies through eco-art education. Insight into key competencies in sustainability is given by presenting the investigation of the group of students about a situation of their reality. The activities implemented, classified according to their objectives, are contextualized regarding the competencies and in learning sequences. This research also contributes to the development of the sustainability competencies framework by applying the theory to a basic education level, adapting the work originally proposed to higher education contexts.

## **ACKNOWLEDGEMENTS**

I would like to express my reverence to:

My biological and chosen families, that nurture and teach me.

My school colleagues and especially to our principal for supporting me in this journey.

All my students and in particular those who participated in this study, sharing joy and giving me hope. You are so special!

Definitely, my therapist, for encouraging me to find myself.

All the people I got to know in South Africa – you inspire me so much!

Dou respeito às coisas desimportantes  
e aos seres desimportantes.  
Prezo insetos mais que aviões.  
Prezo a velocidade  
das tartarugas mais que a dos mísseis.  
Tenho em mim esse atraso de nascença.  
Eu fui aparelhado  
para gostar de passarinhos.  
Tenho abundância de ser feliz por isso.  
Meu quintal é maior do que o mundo.

Manoel de Barros

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## **ABBREVIATIONS AND ACRONYMS**

AR – Action Research

CESMAR – Marist Social Centre of Porto Alegre

EE – Environmental Education

FZB – Fundação Zoobotânica

IBGE – Instituto Brasileiro de Geografia e Estatística

IJB – Irmão Jaime Biazus Marist High School

MS – Ministério da Saúde

PUCRS – Pontifícia Universidade Católica do Rio Grande do Sul

SESC - Serviço Social do Comércio

SMC - Secretaria Municipal de Cultura de Porto Alegre

UNESCO - United Nations Educational Scientific Cultural Organisation

## **CHAPTER 1 – INTRODUCTION**

### **1. 1 Introduction**

This chapter opens the study by giving a perspective on the Brazilian educational situation regarding environmental issues, which encompass varied dimensions. Insight into some perspectives in Environmental Education is given, addressing efforts to systematize a concise framework to investigate and develop Environmental Education strategies. The view is then focused on the context of Horta & Gastronomia, the environmental education school project approached in this research and the context in which it happens. Researcher motivations are presented and linked with the theoretical approaches exposed before the general organisation of the study is given.

### **1. 2 A landscape of processes in Environmental Education and the position of Brazil in it**

From a nutritional view, Brazilians display a deficit in quality food, far below the recommendations (Brasil. Ministério da Saúde [MS], 2013). Quality food is a topic encompassed in the broader issue of health, which gains complexities when confronted with the situation of inequality in the country. Life conditions and development processes are interlinked factors, having implications for the effectiveness of education strategies (Zajonz, Müller & Valentini, 2008). Extreme conditions affecting environments create vicious cycles that often diminish the possibilities of situation improvement by the individuals (Mathias, 2018).

In this complex situation, the country has a series of policies directed at the environment and at Environmental Education (EE). It is possible to trace connections between policies that involve different themes such as food, agriculture, waste, water, basic sanitation and conservation units. Such context supports the precepts of interdisciplinarity advocated by the Brazilian environmental education policies, which approach educational processes regarding individual and collective levels. The National Policy on Food and Nutrition (Brasil. MS, 2013) is an example of policy that articulates different levels and realms from a single topic (food, in this case). It addresses the issue from environmental, cultural, economic and social points of view aiming to support sustainable practices. The text underlines the importance of education that allows each person to make responsible decisions related to their reality.

This kind of approach resonates with views of Environmental Education that recognise the complexity of reality and its environment-related questions. Originally, EE was constituted in a context of behaviouristic trends and was informed by positivism, often focused on inspiring in people “appropriate behaviours” (Gurevitz, 2000). As the understanding of learning processes

in Environmental Education expanded, models including new perspectives were proposed. The model of education *in, about and for* the environment (Palmer, 2002) joins different approaches to EE, each branch representing the positivist, the interpretive and the critical view, respectively. On the light of recent socioecological approaches to Environmental Education, the model is limited, since it only considers EE acting on the individual level.

One of the efforts to investigate the complex reality of environmental problems and its implications for education is the key competencies in sustainability framework (Wiek, Withycombe & Redman, 2011). It was developed from a review of several studies dealing with the development of an effective education for sustainability, presenting five key competencies to be developed in high education contexts. The framework considers the application of knowledge in real-world situations, demanding a systems-thinking competence to evaluate the complex scenarios. Envisioning possible situations requires anticipatory competence, as well as normative competence to apply values related to sustainability to these situations. Putting the ideas in practice demands strategic competence and the whole process of dealing with the situations require collective actions, represented by the interpersonal competence.

Other approaches seek to counterbalance the strong Cartesian and positivist legacy in Environmental Education by acknowledging the role of emotional and relational aspects when dealing with environmental issues. These approaches consider, besides the objective components of information and cognitive knowledge, subjective aspects of human experience, such as skills, intentions, values and beliefs. The affective component, actually, is considered by some as the link to be established between knowledge and action (Galt, Parr & Jagannath, 2012).

Facing the subjective dimension implies accepting non-linear learning processes (Kyburz-Graber, 2012). The uncertainty that arises from such approach can be addressed by using the arts in the process. Developing artistic practices can stimulate features similar to those encountered in childhood, such as an open disposition to explore the world and learn about it, as opposing to rigidity in education (Nitecki & Chung, 2016). Gurevitz (2000) advocates these kind of dispositions can be effective in “encouraging individuals actively to engage” with sustainability (p. 253). Applied to Environmental Education, the use of art strategies is presented as eco-art education, a field in which Inwood (2013) adapted Palmer’s framework of education *in, about and for* the environment (2002).

### **1. 3 Origins: a small point in the big landscape**

Mario Quintana and Rubem Berta are two peri-urban neighbourhoods located in Porto Alegre city, Rio Grande do Sul state, Brazil. Together they constitute the most populated region

of the city (more than 100 thousand people and almost 8% of the population of Porto Alegre, according to the 2000 census) (Brasil. Instituto Brasileiro de Geografia e Estatística [IBGE], 2000) and include some of the poorest spots in the city (the former has the lowest average minimum wage of the city (Brasil. IBGE, 2000)). This community is in the surroundings of Alvorada city, known for its high levels of violence.

The region has a complex composition in terms of its residents. The space was rural until the 60's, when Rubem Berta neighbourhood was officially established, and suffered a populational boom in the 80's, when the government conducted relocations in a "cleaning" plan for the city. Coming from the rural exodus, people were living in the more central regions and "making poverty visible in the way of living in Porto Alegre" (Turmina, Soster, Ketzner & Lahm, 2014, p. 67). They were, then, moved to this region at the boundaries of the city. Nowadays, residents live in popular housings or in informal settlements<sup>1</sup>. The latter type of habitation composes a big part of the Mario Quintana neighbourhood. This neighbourhood still has many green spaces, remains of its rural origins. However, the landscape has been changing in the last years due to new settlements (both by invasions and expropriations), which have reduced these spaces (Turmina et al., 2014).

In the early years of establishment of this community, some actions were started there by religious brothers. The Marist Brothers congregation is an international catholic community operating in 81 countries (Worldwide Marist Presence, n. d.) and has been acting in the community since the early 90's, before Mario Quintana neighbourhood split from Rubem Berta. Mario Quintana, originally part of the latter, was established as a neighbourhood in 1998 (Secretaria Municipal de Cultura de Porto Alegre [SMC], n. d.). As an example of their influence on the community development, and especially in the environmental area, the Marist Brothers are considered fundamental actors in the establishment of the recycling tradition there (Fischer, 2006), which is still the source of income for many people there. Today, CESMAR – Marist Social Centre of Porto Alegre – is a key place in the community, one of the city's most vulnerable in terms of services, education and wellbeing.

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<sup>1</sup>Most of the region is composed by sets of buildings massively constructed to be sold at accessible prices to low income people between the 70's and the 80's. Due to a financial crisis, many buildings were not finished and a series of invasions occurred. This has contributed to the process of "favelização", or "slumization". The other part of the areas is composed of big plots that are not used or are conservation areas. These are frequently invaded by families who settle in there, usually living in precarious houses. For a review of the history of this community, see Tissot (2009).

## 1.4 What place is that?

The Marist Social Centre of Porto Alegre is established at a big tract of land with vegetation, a lake, some animals and the vegetable garden. These components integrate the place enjoyed by all who frequent the centre. The social centre works with the help of public and private institutions, and has three main components: a socio-educational service, a technical division and the “Irmão Jaime Biazus” high school. The socio-educational service works with children from 6 to 14 years of age, offering daily formative activities like dance, literacy workshops, physical education and different types of crafts. The technical division offers technical training to the community related to electronics and professional skills, also working with recycling of electronic devices. There are also other activities for the community such as group reunions (catholic mission groups and elderly groups), social assistance services and festivities.

I met this place in 2015, when joining the staff as a Biology teacher at Irmão Jaime Biazus Marist School (IJB), focused in this research. The School was created in 2012, in response to a need of the community. Until then, there were no high schools in the region. Most of the students at the school come from the neighbouring public primary schools, where the education quality is low and the resources are often scarce. Irmão Jaime Biazus is part of a philanthropic private institution, what inevitably leads to a school environment different from the public ones. The situation of the public education is very complex and often involves low and delayed salaries, lack of teachers and classes and precarious infrastructure. It contrasts with the situation at IJB, where the teachers have better and regular salaries and the school has a good infrastructure. These factors, along with constant school trainings which aim to renovate Christian and Marist values such as presence, solidarity and simplicity, help to create a caring and attentive environment for the students. This different environment reflects on the students – from exchanges with teachers from surrounding schools, we can say they behave differently. When arriving there, the students tend to take some time to adapt to this new environment. There are nearly 360 students attending the school in the mornings (Sobre o Colégio, 2015).

As an educational institution working with vulnerable youth, the educators face challenges regarding the main currents in this field. School, as a traditional education approach, focuses on strong cognitive skills and knowledge, objectivity, predictability and other values derived from rationalism (Phelan, 2004), an approach that does not have strong appeal to these students. In this region, schools face a high absentee rate, an issue that we constantly try to overcome at IJB. As a teacher working there, I have observed that many students get demotivated to continue their studies when elementary skills are required. According to the students in a focus group I have conducted, they find easier ways of being recognized outside

the school grounds, such as joining the ranks of drug dealers, for example. These factors act on the process of students' evasion, along with needing to help their families, either taking care of relatives or having an extra source of income.

The teachers at the school can identify a lack of ownership from the students of their learning processes and pathways. The common study posture is to adopt "the right answers" given by the teachers, the books or the Internet. The teachers are still looking for strategies that help the students to really live what is supposed to be learned, using their experiences and establishing their vocabulary to explore it.

The community has many critical environmental issues. A considerable parcel of the community does not have sewage infrastructure. There is a recycling shed next to CESMAR, which is a source of income to many people from the community, but most houses do not use selective waste collection services, and lots of garbage is found on the streets. In a previous focus group conducted for the contextual profile for this study, students said that the public health service available does not attend to the needs of the community. Regarding feeding, at an extreme level some families face hunger. In general, however, the students said that many people in the community do not have the habit of making their food, but rather buy it ready made. It is cheaper to consume industrialized food than homemade, and people who work often do not have time to cook their own meals.

### **1.5 Starting something – The Horta & Gastronomia Project**

The Horta & Gastronomia (Vegetable Garden & Gastronomy) was created at the Irmão Jaime Biazus Marist High School in 2016, by me and the nutritionist of the school. The project was primarily a response to the precarious health conditions and food insecurity found in the community. The project, headed by me and the nutritionist, was structured intending to explore available resources such as the vegetable garden, the extensive open area, a space with kitchen and the knowledge – mine, related to environmental issues and Biology, and the nutritionist's, related to health and cooking practices. One of the project's aims is to improve students' food and health habits, as indicated by the policy on food security (Brasil. MS, 2013), through the development of a sense of self-care. The project activities are planned in order to present more critically conscious and sustainable ways of living.

The project took the form of an optional extra-curricular activity offered by IJB. At the beginning of each school year, a group of approximately 20 students is composed from the interested ones who apply for it. Each year holds an edition of the Project, which lasts in average seven months. Happening one afternoon a week, each Project edition has an average of

25 meetings. The group is also integrated by with two participants from the previous edition, who help to run the activities.

Along the meetings, different topics are approached, such as biodiversity, ecology, consumption, waste, food chain production and health. The project aims to develop students' awareness of possibilities to take care of themselves, through healthier relationships, critical thinking and skills in food production. The activities alternate between working in the garden and kitchen and theoretical background on the different topics. The Horta & Gastronomia plan tries to include practical activities that sensitize the students, often adopting eco-art strategies. Resources such as movies, pictures, stories and objects are used in stimulating activities, and the discussions emanate from the students' perceptions and experiences. To strengthen discussions, theoretical background is added, presenting concepts and stimulating links with school subjects. Generally, the students produce some kind of output to illustrate their discoveries.

Following Brazilian policies on interdisciplinarity in Environmental Education, besides the usual guidance of me and the nutritionist, teachers from subjects other than Biology participate whenever it is possible. For example, the Sociology and the Physical Education teachers participate when discussing consumption, food chain production, socio-biodiversity, health and the body functioning. Also, besides the activities at school, some visits to places of interest are conducted.

## **1. 6 Rationale for the study and researcher motivation**

My first academic experience was the Biology course, where I learned to exercise scepticism and the rigour of the scientific method. Then, exploring the field of education, I found in Waldorf pedagogy the importance of integrating a spiritual view in an education that allows the development of humans in all their potentiality. With this background, I directed this research motivated by exploration of the integration between unveiling the reality of the tangible, material world and the infinite possibilities of creation that the human nature harbours. This integration is translated by adopting the key competencies in sustainability framework (Wiek et al., 2011) and the field of eco-art education.

The key competencies in sustainability framework represents a point of reference to what is expected to be achieved. The framework is proposed considering the level of higher education and is still at the stage of being verified and of establishing concrete ways of being developed (Wiek et al., 2011). Thus, the present study proposes to explore the application of the framework at a basic education level. Possible forms of developing the competencies are approached applying eco-art strategies.

The two approaches are used to explore the experience of the group which attended the Horta & Gastronomía Project in 2017, constituting a case study. The project, which already existed before the beginning of this research using some elements of the fields, provides inputs to reflection. A second phase is then conducted as an intervention, this time delineated to directly explore the application of Wiek et al.'s framework (2011) and eco-art education with the students. Therefore, action research structures this research as it is.

### **1. 7 Research goals & questions**

Given the exposed above, the research question is presented as the following:

How can eco-art strategies facilitate the establishment of sustainability competencies in a school garden education project focusing on food security?

The research question is split in two sub-questions to be investigated:

Sub-question 1: What sustainability competencies and what relations between these emerge from an eco-art informed intervention in a garden education project?

This sub-question aims to assess the effectiveness of the eco-art activities applied at the Horta & Gastronomía Project and the subsequent intervention in enabling the establishment of the key sustainability competencies.

Sub-question 2: How can eco-art education act as a medium for facilitating sustainability learning in a school garden education project?

This sub-question focuses on exploring how the different eco-art approaches employed in the project have supported the development of sustainability competencies.

### **1. 8 Research outline**

The research integrates the topics presented above in the following sequence. Chapter two explores some understandings of Environmental Education along the time, linking these ideas to the features of eco-art education and the key competencies in sustainability framework. Food and health issues are contextualized on the relevant Brazilian policies and Brazilian reality. In Chapter three, details on the project and the post-project intervention are given, describing the activities and defining two action research cycles. The related analytic phases employed to explore the research questions are elucidated in relation to the cycles of research and ethical and validity issues are also considered. Chapter four presents the results regarding the eco-art activities and insights into the expression of sustainability competencies from the group of students.



## **CHAPTER 2 – LITERATURE REVIEW**

### **2.1 Introduction**

Although Environmental Education (EE) may be seen as a well-established field with unified goals and values, we find many different streams with diverse positioning in it. It is important to know and reflect on the different practices to better analyse what may be more appropriate in a determined context. In this section, I try to present some visions in EE to then show recent approaches that aim to compose a more integrated strategy and how art can help this. Later, a framework on the development of sustainability competencies is presented in order to view some way of assessing effectiveness of strategies. The focus then goes to some national policies related to EE and food security, which is the focus of the school garden project in Brazil approached in this work.

### **2.2 An apparent bias and different views building Environmental Education**

The trajectory of the field of Environmental Education has been composed of paths from several different approaches and authors try to systematize and interpret this changing landscape. Brazilian researcher Silva (2007) proposes three categories of EE: Conservative, Pragmatic and Critical. According to her, Conservative Environmental Education presents a well-defined dichotomy between human and nature in the light of a romantic and conservationist view of the latter. Pragmatic Environmental Education focus on finding solutions and giving norms to change the individual behaviour and build sustainable development; it does approach the social factor of environmental problems, but with no problematization about it. The political view of environmental issues is present in Critical Environmental Education, which proposes a collective search for transformation of our present socio-economic model.

Another attempt to map EE is made by Loureiro (2005), who establishes two major axes in the field. The first one is called Conservative or behaviour-oriented and encompasses Silva's (2007) Conservative and Pragmatic categories of EE. According to the author, it doesn't contextualise the processes or stimulates reflection on the different social actors causing environmental problems. The second axis is called Transformative, critical or emancipatory and is said to approach more the complex view of problems, including the social factor in them, intending to "redefine the way that we relate to our and other species and the planet" (p. 1476),

or in other words, intending to change the broader mechanisms and values that shape our society.

The different ways of practising EE are, according to Crespo (1998, cited by Silva, 2007), influenced by two currents of environmentalism: Pragmatic and Ideological. The first one is very similar to Silva's (2007) and Loureiro's (2005) views on pragmatic approaches focusing on natural resources management. The Ideological environmentalism is concerned with "deconstructing rationalities" and approaches more the Critical views explained by the two mentioned authors (Loureiro, 2005; Silva, 2007).

Despite the heterogeneity of the field, a recurrent challenge that is revealed to the ones who are involved in it is how to make an effective, "ideal" Environmental Education intervention. An effort to contribute to this question is made by Palmer (2002), who tries to integrate approaches in a model based on the UK School's council's *Project Environment* (1974). This model shows Environmental Education having three components that must be taken into account when planning actions, which are: education *in* the environment, *about* the environment and *for* the environment. Education about the environment would refer to facts and concepts that build the knowledge and understanding about environment functioning. Education in the environment would be acted *in situ* and/or using tangible elements to provide first-hand experiences. By its turn, education for the environment would be directed to applying the knowledge to problem solving and the reflection and learning would be more action oriented. These components combine what the author claims to be essential elements of EE, which are experience, concern and action, as Fig. 2.1 below shows:

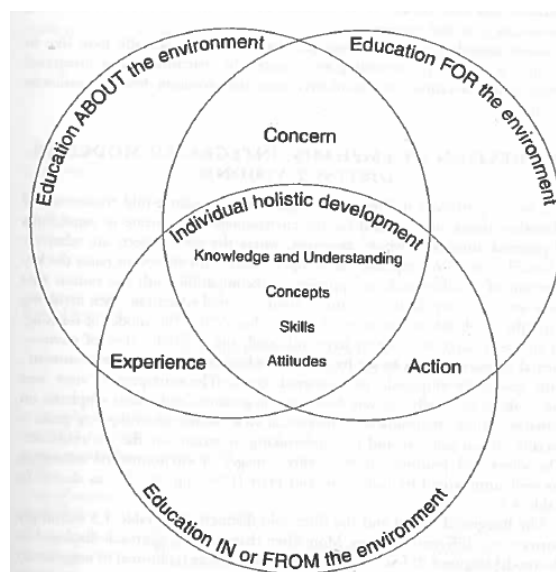


Fig. 2. 1: Palmer's overall model for teaching and learning in Environmental Education (Palmer, 2002).

Dealing with real-world situations, linking learning to learners' lives, is an approach that Palmer (2002) points to influence all the streams addressed. Using this kind of strategy is recommended and can facilitate the knowledge *about* the environment (p. 143); it constitutes the empirical factor *in* the environment (p. 144) and is the objective to be solved *for* the environment (p. 144).

The framework of education about, in and for the environment has parallels with different epistemological views of environmental education (Palmer, 2002). The author indicates that the functioning of the *about* stream resembles the positivist view, very focused on theories and information acquirement. The *in* stream would fit into an interpretivist view and the *for* stream into the critical view. The author sees the model as integrated, with the three streams interconnected and depending on each other. However, there are simplistic assumptions about what they would generate. The knowledge *about* the environment, particularly built upon experiences from students' lives, "will also inevitably encourage the appreciation and promotion of desired *values* and *attitudes*" (p. 143) and enable critical evaluation of issues; learning *in* the environment would "enable reflection and the development of critical awareness and concern" (p. 144), and learning *for* the environment would influence the establishment of an "ethics for the world" (p. 144).

The critiques to this model can be expanded at least in three points: its assumption of linear causality the individualism and the claim of holism. First, the idea that being aware of environmental functioning and problems leads directly to actions favourable to the environment is argued by many authors to be a simplistic and inaccurate logic (Braun & Dierkes, 2017; Chawla & Cushing, 2007; Redman & Larson, 2011). A strong trend in EE has been based on cognitive theory and supports this idea of linear causality (Gurevitz, 2000), an assumption adopted by Palmer in his (2003) model as the previous paragraph shows, and its general scheme is illustrated by Finger (1994) and shown in Fig. 2.2. This author explores the relations between environmental experiences, learning and behaviour and his results defy the standard rationality by not finding evidence of behaviour definition by information acquirement. Actually, such kind of EE exclusively "about" the environment - one of the streams from Palmer's (2002) integrated model - could, in some cases, even raise challenges in dealing emotionally with such complex interactions and intricate problems (Finger, 1994; Gurevitz, 2000, p. 255).

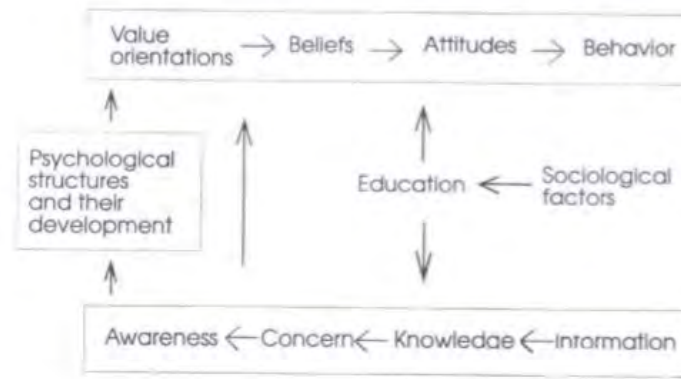


Fig. 2. 2: Main model used in some views of Environmental Education showing direct relations between acquired information and behaviour (Finger, 1994).

This “about” stream, focused on cognitive knowledge, has been the main focus of Environmental Education for most of its history, following the main tradition in school education, based strongly on scientific knowledge (Gough, 2003; Gurevitz, 2000; Inwood, 2008). Education has incorporated some values from science and rationalism like objectivity, predictability and rigour, validating cognitive knowledge over others (Phelan, 2004). The accurate, measurable predictions proclaimed by the “hard sciences” (Connole, 1998) have been translated to EE, either in its research field and in EE actions. Research in EE has adopted a positivist attitude that generated a determinist, individualistic position (Robottom & Hart, 1993, cited in Gough, 2013), which is being identified and critiqued on Palmer’s (2003) “about” stream. When applying EE actions in the field, that has had influence as a belief in defined rules applied through a behaviourist approach (Gough, 2013).

Firstly, growing results of EE research on behaviour change are taking us to the notion that there are not simple determinants to actions favourable to the environment and that changing behaviours are reflective of nonlinear components (Gough, 2013). Also, the behaviourist approach allows one to affirm what actions are “favourable to the environment”, which is itself a problematic expression if we consider the critical currents of EE presented earlier. According to these currents, each context is particular and there are no right rules or magical solutions to deal with environmental issues. Better than focus on finding or applying them would be to empower individuals to deal with and act within their own contexts. The idea of empowerment of individuals implies “transform[ing] their whole self into an environmental being or environmental citizen”, engaging other persons to change levels of society broader than the individual (Ferreira, 2013, p.63).

These broader levels which must be changed were already present in UNESCO’s Environmental Programme (UNESCO – UNEP) in 1978. One of the goals of EE presented on

its recommendation 2 includes “groups and society as a whole” needing to change its behaviour (UNESCO – UNEP, 1978, p. 26). This aspect leads to a second critique of Palmer’s model (2003) regarding its individual focus (as seen in the central space in Fig. 2.1). Socioecological approaches are being increasingly adopted in order to deal with the complexity of environmental issues and are linked with critical views in EE (Kyburz-Graber, 2013). It is known that most of environmental damage is caused by big actors like the industry sector, which would require actions in the “public sphere”, as opposed to individual behaviour change at the “private sphere” that has been much advocated (Stern, 2000, cited by Chawla & Cushing, 2007, p. 438). Acknowledging the importance of this broader view, there was already a current of Science Education educators in the 1970s that proposed an approach to it using a science-technology-society(-environment) movement (Hart, 2012, p. 104). No change at the “public sphere” or socioecological approaches can be done at the individual level, and Chawla and Cushing (2007) explore the collective factor in their synthesis of research on active care for the environment. They explain how one’s sense of competence (“the belief that one can achieve success in areas of personal significance”, p. 444) is dependent on interactions with others, through examples, motivation and discussions with peers and achievement of collective goals.

The variety of EE divisions can also be seen on a myriad of interpretations of some concepts. “Holism” is one of them and is the third critique of Palmer’s (2003) model. This is a concept often valued in EE approaches that can be used having quite different meanings, as Loureiro (2005, p. 1478) exemplifies. What does it mean, however, to be holistic? The author shows that this concept is used in the so called systemic-holistic views referring mostly to the physical, materialistic aspects of reality such as living organisms, ecological interactions, thermodynamics and so on. This point of view has the risk of aiming to reach a “Truth” or unique method of lead to it, according to the author, which is very close to the behaviourist approach and to the aspiration for “an” effective EE intervention, as an immutable entity (Gough, 2013b, p. 16). On the other hand, dialectic perspectives take into account the human role on shaping the environment and building society with all the conflicts involved, not having an idea of equilibrium of the system.

Just like Palmer (2003), other authors (Bloom, 1956; Hungerford & Volk, 1990; Stern, 2000) have proposed three-layered frameworks which consider aspects other than information acquirement as important to EE. With time, a notion that educational efforts should address action and personal composition, as well as having information, emerged and gained force.

### **2. 3 There is something disbalanced – exploring dichotomies**

The struggle to achieve academic results related to the values from rationalism mentioned earlier has defined an education basically focused on the mind, forgetting other human elements like body and feelings (Gough, 2013; Rathunde, 2009). Environmental Education followed this tradition, having its roots in science education (Inwood, 2008), which generally only recognises rational knowledge derived from mainly quantitative methods (McNiff & Whitehead, 2002). Some of the influence of science on our way of seeing and discovering the world (or parts of it) is described by Dourado, Belizário and Paulino (2015). In its endeavour to know objectively as many aspects of reality as possible, science has neglected several aspects of the world. Associated with the dominant parcels, it flourished along with colonialism and erased any forms of knowledge that differ from it – constituting what some call epistemicide. In this process dualisms such as researchers/research objects were established, denying people other than the colonizers the right to speak about their own reality (Said, as cited in Dourado et al., 2015).

With this legacy, current education is said to contribute to unsustainability (Sipos, Battisti & Grimm, 2008; Frisk & Larson, 2011). Also adopted in the scientific exploration of the world, the human/nature dichotomy contributed to the environmental crisis by neglecting to see nature as part of us. Thus, the predominance of science-oriented education has been criticised (Braun & Dierkes, 2017; Lineberry & Wiek, 2016), even with the relation of science with society having changed. With the rapid advent of new technologies, scientists had to bring novel topics to discussion. Due to the difficulty in predicting how we can be affected by the rapid changing lifestyles, science discussion now includes features of risk, uncertainty and indeterminacy (Fensham, 2012). In this context, the intimacy of science in our lives raises socio-scientific issues (SSIs).

From the positivist science legacy, another dichotomy arises: reason and emotion. This dichotomy can be attributed originally to the cartesian tradition that accompanies it, which suggests that emotion can bias science (Milton, 2002). Challenging this view, learning frameworks expanded to include other aspects besides cognition. Bloom (1956) establishes three distinct domains of learning: cognitive, affective and psychomotor. An operationalization to these domains was proposed in form of “head, heart and hands” (Sipos et al., 2008). Redman and Larson (2011) reviewed behavioural theories and used four domains of knowledge (declarative, procedural, effective and social) to propose four sustainability competencies to be considered in scholar contexts. This framework considers information, skills, strategies, intentions, values and beliefs.

Recent authors have pointed that emotions actually play an important role in learning, being essential for knowledge to exist (Damasio, 2012; Gieser, 2008; Milton, 2002), and suggested that the affective realm can constitute the bridge between cognitive knowledge and action (Galt et al., 2012). Emotions define our bonds and guide deeply our actions (Gurevitz, 2000), therefore constituting an important factor to be considered in EE actions. From this understanding, emotional literacy was incorporated as a strategy in these. Also known as “social and emotional learning”, it is related with two of UNESCO’s four pillars of education: “learning to be” and “learning to live together” (Hromek & Roffey, 2009). Emotional literacy enables the development of resilience and healthy relationships, important to coping strategies, for example, in violence and drug situations (Hromek & Roffey, 2009).

Among the efforts to overcome the dichotomies as conflicting oppositions, Lieblein, Breland, Østergaard, Salomonsson and Francis (2007) created a framework for agroecological learning that considers the learning process as an interaction of internal and external steps: for each educational strategy, the learner goes through an internal process to learn. This way, cognitive steps and internal processes of personal exploration are not opposed in a dichotomy, but rather complement each other in a dialectical way.

The rise of socioecological approaches challenges the educational paradigm of rationality, which has a limited set of instruments, often lectures and written assessments. Socioecological approaches admit that consensus on determined solutions or “right” attitudes are not possible and adopt learning as a social process. These orientations agree that learning not always follows pre-defined and linear steps, adopting instead principles of constructive, reflective, critical and participatory processes (Kyburz-Graber, 2012). Thus, uncertainty is faced and creativity gains investments in affective approaches. Alternative views of education explore strategies such as playfulness, meditation, movement, and arts-based ones.

Another frequently misunderstood aspect is the importance of play in education. Play is often recognised as a vital component in all aspects of early childhood development, despite some rising tendencies to dismiss it in favour of premature academic readiness. Nitecki and Chung (2016) comment on, at adult stage, reclaiming some “child parts” as a response to this “era of rigidity and accountability in education” (p. 29). It is a path of discovery through which one can develop various skills, values and emotional coping strategies (Nitecki & Chung, 2016). Learning at childhood is often light and deprived of pressures due to this nature, and the relaxed and funny states arising from it show benefits such as improving learning, optimism, creativity to solve problems and emotional and physical resilience (Hromek & Roffey, 2009).

Building on place-based education, Nitecki and Chung (2016) advocate that place plays a central role in learning processes. “Sense of place” experiences are conceptualised by Wilson (1997) by offering opportunities of quietness and seclusion, exploration and change effectuation. These experiences in childhood foster characteristics inherent to this stage and that facilitate EE, such as sense of wonder, openness, investigation and discovery (Wilson, 1997). Nitecki and Chung (2016) consider place either as the *context* in which the learner is inserted and the internal world of creativity and meaning making. “The place should be nurtured and protected”, so inner places should be equally valued and playfulness has a vital role in it.

Considering human’s “inner spaces” is important to responding adequately to the environmental crisis, as this could help to perceive and interact with the (socio)ecological relations around us (Dodds, as cited in Loo & Selbach, 2015). Current times present us an excessive amount of stimuli, leading to a paradoxical state of overexcitation and apathy (Miranda, 2017). Such state implies that most learning happens “second hand”, from external representations instead of personal experiences (van Boeckel, 2009). Miranda (2017) presents serenity as a possibility to equalising the excesses we experience nowadays and to allowing aesthetic experiences by opening perception and sensibility. The concept of serenity used by her draws on Heidegger’s *Gelassenheit*, which leads to a meditative and relaxed form of thinking deprived of pre-established conclusions. She explains that, applied to aesthetics, this view contributes to synesthetic appreciation of artworks, rather than concept apprehension from them. Such form of experience opens the observer to think what was not thought yet, or the unspoken to emerge. At an educational level, this process has parallels with the concept of “active absence” developed by Kaplan (2002). The concept uses the image of an opening protea (a kind of flower) to give the idea of a safe and apparently empty space where the unexpected can emerge. Meditation and mindfulness are strategies that also contribute to such return to sensitive perception and can play an important role on the development of confidence, critical thinking and openness, as well as emotional literacy (Sable, 2014).

Along with the efforts to educate attention to oneself and developing emotional literacy, some approaches also stimulate the physical body. Emotions are intimately related to our bodily experience, as a phenomenological view can explain. Merleau-Ponty (as cited in Gieser, 2008) states that every experience has implications at the physical level. Thus, we incorporate in our bodies – we embody - the world we perceive. The body allows perception used to imitate (to be incorporated) in some learning processes, which can be linked to empathy, meaning “feel into” in its etymological roots (Gieser, 2008; Jeffers, 2009).

Educational contexts that follow socioecological orientation welcome various ways of expression. Metaphors can be promising tools when exploring our conceptions and discourses,



acting in questioning our everyday assumptions (Reid & Scott, 2013), although some see this resource as an obstacle to science (Milton, 2002). Poetry often employs this tool to challenge dominant views, being subjective, emotional and intuitive, and coming from the senses, thus constituting embodied knowing (Hopkinson, 2015). All these features are attributed to arts in general. Art, for a long time, remained in the “irrational” side of the historical dualism established against rationality, as Clover, Jayme, Hall and Follen (2013) describe happening since the classical Greek times of Plato and Aristotle, for example.

“Flow learning” is a model developed by Joseph Cornell (2009) and directed to guide EE interventions. It proposes four sequential types of activities, which are: Awaken Enthusiasm, Focus Attention, Direct Experience and Share Inspiration. Cornell’s work brings several activities for each stage, generally themed by and/or located at “nature”. Awaken Enthusiasm activities stimulate participants to get involved and must be fun. From this, calming activities from Focus Attention allow people to open their senses and exercise their observation, states required to take more from the following stage. Direct Experience is the moment where the guide can develop the topic of interest, in a way that captivates the participants, deepening their connection with nature. At last, the whole experience is assimilated through Share Inspiration activities, which can stimulate interaction between the participants, giving them an opportunity to report their experiences.

## **2.4 Eco-art education**

As an approach to the research process, art can present itself by creation of arts-based or arts-informed researches. The last represents an opportunity to expand the realm of “acceptable” explanations for the human beyond the “logical positivism and technical rationality” (Cole & Knowles, 2008).

Art represents a way to develop a myriad of skills, traces or concepts. Strategies that employ aesthetic orientations can make people situate themselves and get closer to their environment (Engel, as cited in Gurevitz, 2000), develop ethical feelings (Marin, 2006), interpret and signify experiences, as well as find meaning in their relationship with the environment (van Boeckel, 2009). Art is also said to foster the reclaiming of feelings often present in childhood, such as wonder, and help explore one’s personal world (mentioned in the previous section; van Boeckel, 2009), thus contributing to the development of emotional literacy. In this sense, aesthetic appreciation contributes to attune the perception of the “world of others” and the “world of objects” in a phenomenological view (Jeffers, 2009).

Beyond the “inner spaces”, art can strongly engage the senses in the discovery and understanding of the world. The sense of wonder it inspires follows feelings of defamiliarization, causing one to see the ordinary world as new (van Boeckel, 2009), a feature also required for the investigation process in science which can provide meaningful learning. Therefore, arts-based environmental education can constitute experiential learning in open-ended processes (van Boeckel, 2009), something that Inwood (2007) explains to stimulate feelings of empowerment and interconnection. Learning processes mediated through art are explained by Catterall (2005) using concepts of conversation and silence. The former is used either in relation to social or inner dialogues and the latter referring to “subconscious brain function and cognitive re-structuring” (p.1). This re-structuring can be expressed as an artistic activity facilitating the development of other abilities not necessarily related to art, for example, playing the piano acting later in easier understanding of fractions and proportions in mathematics.

Efigênia is a Brazilian “artist of the waste” who gives new meaning to diverse kinds of waste, turning them into objects, costumes, dolls, stories, poetry, performances. Kasper (2014) tells her story with this artist and describes her “didactic of creation”, which teaches to value life and to invent new ways of existing. This example shows the potential for transmutation in art, changing perceptions about often commonplace topics that, however, can hide bigger problems. Artworks can engage the public in current socioenvironmental issues, therefore addressing political aspects (Clover et. al, 2013). Accordingly, Lineberry and Wiek (2016) present art as a promising means of unveiling inedited ways of dealing with sustainability issues, constituting an integrative approach. It enables intimacy with the environmental dimension not only to comprehend it, but also to transform it – seeing its tragedy but also “its revolutionary beauty” (Sato & Passos, 2009, p. 45). The freedom of expression given by artistic practice can help to cope with the contemporary ambiguities and uncertainties and additionally to create responses to it. Sato and Passos (2009) use the Surrealist movement informing their text as “a political movement that remains in the desire of changing life, allowing dream” (p. 49). They describe some activities (namely of the *exquisite corpse* kind) that follow this orientation, inciting collaborative creation that gives room to the unexpected, inspiring the participants to trust one another.

Approaches to art education can be subject-focused or student-focused, represented respectively by Discipline-Based Art Education and “creativity paradigms”, as explored by Irwin and Chalmers (2007). The former is subject-based and draws mainly on already existing artworks to develop the learning experiences, being the curriculum an objective of the process. This approach can be described as “experiencing the visual”, as observers in relation to

artworks. The latter can be described as a “visualizing experience” and focuses on student self-expression and innate creativity rather than on intellectual work and study of art currents and structures. The aesthetic appreciation developed in Aesthetic Education can spread the attention to values and meanings developed in it to broader domains in life than art (p. 181).

Eco-art education is a field that presents ways to balance the rationalist tradition in EE, bringing, from art education, attention to the senses, creativity and affection (Inwood, 2008, p.58). The field is used both to critique the current state of unsustainability and to work relationships between people and the environment (Vasko, 2016). Hilary Inwood is currently a reference in the field of Eco-Art Education, having developed her doctoral thesis (2007) on the development of eco-art strategies with elementary teachers. The *in, for* and *about* framework (see Section 2.1) was adapted to the eco-art field, using *in* the environment approaches for nature as site for art-making and/or exhibiting art; *about* the environment for nature as an art subject, as art created with natural materials and art created with the 3Rs; and *for* the environment when viewing and critiquing eco-art art as activism (Inwood, 2013).

## 2. 5 Sustainability competencies

Many frameworks are being proposed in attempts to make more secure the path to sustainability development. Competent citizens are claimed as essential to building this scenario, and the concept of competence unveiled as a guide to achieve this, as Adomßent and Hoffmann (2013) state. To integrate the existing frameworks, Wiek, Withycombe and Redman (2011) reviewed the literature and proposed an integrated model with five key sustainability competencies. The concept of competence used by them draws on Spady (1994) and Baartman and colleagues (2007), defined as “a functionally linked complex of knowledge, skills, and attitudes that enable successful task performance and problem solving” (p. 204).

Defined competencies can guide sustainability learning process with some objectivity, although some critiques to this framework include the problem of standardization in a constantly changing world (Barnett, 1994). The authors of the framework underline the importance of having “a commonly shared framework for developing distinct and recognizable profiles of the academic field, the schools, the graduates, the professions, and so forth” (p. 204). They present the framework to be used in dealing with real-world problems (p. 204). Besides, basic competencies, required not only to sustainability issues, should not be forgotten when applying problem solving in sustainability.

The development of sustainability, according to Wiek and colleagues (2011), requires **systems-thinking** competence, needed “for identifying intervention points, anticipating future

trajectories and staging transition processes” (p. 207). It involves understanding in different areas and proportions, in a way that is possible to recognize connections between them. **Anticipatory competence** requires the individual to have the ability to view and analyse future scenarios in various ways. It demands information about current states as well as creativity and imagination. **Normative competence** is about dealing with “sustainability values, principles, goals, and targets” (Wiek et al., 2011, p. 209). This competence supports the previous two by taking ethics into account. **Strategic competence** enables “linking knowledge to action”, or in other words, “co-constructing knowledge and practical solutions” (p. 210).

It is important to note that all competencies are referred to in a collective meaning, an aspect advocated by Chawla and Cushing (2007; discussed in 2.1). In order to address the importance of relations between individuals and others and between individuals and the group, **interpersonal competence** is defined. This competence is seen a central in supporting the other competencies. This competence entails communication, collaboration, empathy and epistemological pluralism (Wiek et al., 2011, p.211).

This field requires further studies on diverse topics (Raven, 2001), since it is in its early stages of development. Wiek and colleagues (2011) warn that, firstly, empirical evidence for the role of these competencies in effective problem-solving is still needed to assess the validity of the model. Also, due to the abstract concept of competency, challenges arise when it comes to developing teaching strategies in this realm (Remington-Doucette & Musgrove, 2015). The “translation into specific learning outcomes” (Wiek et al., 2011) must happen especially to assess the process, so the framework development can be expanded.

Rethinking education strategies in a large scale, thus, is presented as necessary when searching for effective ways to allow “competent citizens” to flourish (Adomßent & Hoffmann, 2013; Wiek, Bernstein, Foley, Cohen, Forrest, Kuzdas, Kay & Keeler, 2015). In this sense, Rost (2010, cited by Adomßent, & Hoffmann, 2013) points out that competencies should be developed instead of communicated. Barth, Godemann, Rieckmann and Stoltenberg (2007) draw attention to the importance of considering the interaction between cognitive and non-cognitive elements present in a competency. They say that non-cognitive elements are related with value interiorization, what reinforces student-focused approaches. These approaches must incorporate affective approaches and stimulate students to actively confront their assumptions and value systems with reality.

The authors are clear when suggesting learning paths to develop sustainability competencies: working with real-world situations in problem and project-based, solution-oriented learning approaches (Caniglia, 2016; Wiek et al., 2015). Most applications of this

framework have been done at higher education level, however Wiek and colleagues (2015) proposed learning objectives directed to high school level (Shown in Appendix F). Even on university settings, Barth and colleagues (2007) refer to the importance of informal settings on the learning process (i.e. not planned by curriculum). This form of learning particularly boosts competencies development when taking the form of experiential learning. The authors describe the features drawing on Kolb, which are the following: whole involvement of the learner (intellectual, sensory and emotional realms), mobilising previous personal experiences and deeper understanding emerging from reflection. They advise, therefore, interdisciplinarity in formal settings that offer multifaceted contexts, which are commonly found in informal settings, as much as possible.

Sustainability competencies have been assessed using scores, and systems-thinking competence has been more easily assessed among the others, frequently by tests (Remington-Doucette & Musgrove, 2015). A noteworthy aspect to evaluation is the double-dimensionality of interpersonal competence pointed by the authors: conceptual knowledge about the skills involved in it and the actual practice and observable ways of interacting with people. They also suggest that early ages are prone to engage in sustainability due to an “inclination to think about the future”, a probably relevant feature when considering anticipatory competency.

Galt and colleagues (2013) propose that the behaviourist vein of competencies approach can be overcome through implementing self-assessments. This represents a more democratic way of working with the framework and also addresses the difficulty to assess it externally. Giving learners space to shape the learning setting is a key factor in changing the “culture of teaching” for the necessary “culture of learning” (Barth et al., 2007).

## **2. 6 Something on Brazilian Environmental Education**

Officially, EE in Brazil started in 1981 with the publication of the National Policy of Environment (Brasil, 1981), which stated the necessity of the EE in all levels of education. In an effort to support the strengthening of EE in the country, a National Programme of Environmental Education (PRONEA) was launched 13 years later, in 1994. After this, the National Policy for Environmental Education (Brasil, 1999) was established and in 2012 the National Guidelines for Environmental Education (Brasil, 2012). The definition of Environmental Education on these policies involves the building of “social values, knowledge, abilities and competencies directed to conservation of the environment” (Brasil, 1999) through processes at individual and collective scales. Drawing on the Brazilian Constitution (Brasil, 1988), the environment is faced as a common good, “essential to healthy life and its sustainability” (Brasil, 1999).

The features required to EE in the above mentioned Brazilian policies include continuity, interdisciplinarity and presence in all knowledge areas, acting towards a complete understanding of society. Following this impetus, several policies have been created contextualizing EE on the spheres of familiar agriculture, waste, water, basic sanitation and conservation units<sup>2</sup>.

One of these policies speaking to the scope of EE is the National Policy on Food and Nutrition (Brasil. MS, 2013), that stresses the importance of easy access to quality food based on sustainable practices, from an environmental, cultural, economic and social point of view. The document discusses food security considering other essential needs and health-promoting food habits and cultural diversity. According to the policy, the focus of sustainably produced food should be directed towards those directly involved in the production, distribution and final consumption of food. The Food Security policy argues that food production is important for “on one hand, enhancing the capacity of interpretation and analysis of oneself and the world and on the other hand, the capacity of making choices, rules and producing one’s own life” (Brasil. MS, 2013, p.23). This quote indicates a concern for autonomy and is also relevant to the citizenship formation intended in the policies on Environmental Education. Thus, the policies on Environmental Education and food security can be mutually supportive.

The National Policy on Food (Brasil. MS, 2013) reveals that the average Brazilian diet is rich in fats, sodium and sugar, poor in micronutrients and high in calories. This policy also notes that vegetable consumption is still far below the recommended, while ultra-processed food consumption is growing. If focused on EE actions, themes like food security and basic sanitation, for example, hold potential to involve people, since they deal with health issues, “obviously relevant to everyone” (Kyburz-Graber, 2012).

It is pertinent to question what kind of education is being implemented in the country. Studies (Layrargues, 2002; Nogueira, 2016) point to the prevalence of the issue of waste as the focus in EE actions, generally in a technical approach, not questioning the broader context that generates the problem (Conservative or Pragmatic approaches as presented in section 2.1). However, contextualizing EE movements in different countries, Sato and Passos (2009) reinforce the importance of the social factor in the “environmental” term, a feature adopted in the Brazilian identity in a realm that interposes nature and culture. It seems that there are

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<sup>2</sup> The mentioned policies are: Programme of Environmental Education and Familiar Agriculture (PEEAF); Strategy of Environmental Education and Social Communication on Waste Management (EducaRes); Nacional System of Hydric Resources Management (Singreh); Programme of Environmental Education and Social Mobilization on Sanitation (PEAMSS); and National Strategy of Environmental Education and Communication on Conservation Units (Encea), according to information on the National Programme of Environmental Education (ProNEA – Brasil. Ministério do Meio Ambiente [MMA], 2014).

difficulties in Brazilian schools to follow the national policies, due to lack of resources and teacher training on this aspect. This was demonstrated by Tommasiello and Rocha (2013; Tommasiello, Rocha & Bergamashi, 2015) in their investigation of teacher's perceptions and actions regarding Environmental Education in the Minas Gerais and Goiás states, Brazil.

## **2. 6 Gardens as facilitators**

Gardening is a well-known strategy in EE due to its potential to address various themes; they can be used as “generating issues” in interdisciplinary projects. Tozoni-Reis (2006) explores the idea by explaining that a critical environmental education can use environmental issues not as ends themselves, but as starting points to reflect on broader scales. In other words, the educational process would start from a concrete problem in the learners' reality to, beyond finding solutions to it, seek a sustainable society through an action-reflection-action process.

Besides deepening the connection with nature, gardening can also deepen gardeners' connection with themselves. Taking care of a garden can even shape one's sense of identity, and it can be associated with establishing bonds with the community (Freeman, 2012). The practice strengthens attention to our own bodies, with all the context improving physical and psychological health (Prakash, as cited in Kulnieks, Longboat & Young, 2013). The benefits expand when the practice is communal, possibly generating “collective, constructivist, synergistic and transformative” learning (Walter, 2013).

Inwood (2007) establishes a parallel between gardening and artmaking, for both experiential practices involve “getting your hands dirty” and a process of creation where you never know exactly what the result will be (p. 3). This can also be true regarding cooking, especially when it is associated with cultivating food gardens. Seeking sustainable and genuine ways of improving our relation with food, the connection with community and ancestry can be developed by approaching indigenous knowledges (Kulnieks et al., 2013).

## **2. 7 Translating these stimuli into something else**

Art can facilitate the building of the key sustainability competencies proposed by Wiek and colleagues (2011) by enhancing and structuring learning. Specifically, anticipatory competence can be stimulated by the developed imagination, and the emotional approach supports interpersonal competence, besides learning to face current conditions (described in Section 2.3), which resonates with the key sustainability competencies applied to real world.

Additional challenges arise when considering sustainability learning in peripheral areas. The whole context – social, environmental, economic – depends on the different developmental

aspects of people. For example, it was found that social and motor development was lower in poorer and unstructured families (Zajonc et al., 2008). The study reports that low socioeconomic conditions are related to child vulnerability by causing malnutrition, social deprivation and educational disadvantages. Illustrating the interrelation between the different realms, Mathias (2018) shows how violence and health are interdependent factors in marginalised areas in Brazil. Armed conflicts influence policies in general and even the geography of these territories, when barricades are implemented, for example. These alterations affect floods, aggravating health conditions in regions deprived of basic sanitation infrastructure. Dwellers get sick more often and due to territorial conditions do not get actively involved in modifying their environment. Thus, inequality presents itself as the primordial violence and a treat to health.

The present review showed changes on trends in Environmental Education, from behaviourist approaches to socioecological ones, which adopt collective, participatory orientations. Such changes brought to light new strategies that deal with emotional and physical bodies, besides the cognitive realm. Eco-art constitutes a field in Environmental Education that adopts these strategies, enabling learners to understand and create responses to the current environmental issues. These abilities resonate with the key sustainability competencies framework, which is still developing and searching directions to be operational. The next chapter delimitates how the framework is applied and takes body in this action research, investigating if and how eco-art can contribute to the key sustainability competencies framework in the context described in Chapter 1.



## **CHAPTER 3 – METHODOLOGY**

### **3.1 Introduction**

The research questions (presented in Section 1.7) are directed at art-informed teaching strategies which are part of the Horta & Gastronomía project, a periodic extra-curricular activity offered by the school where I teach and the objectives of this research include improving these strategies, as well as investigating the possible development of sustainability competencies. This interest suits a Participatory Action Research (PAR) orientation to research, which is elaborated in the first section in the chapter. The two cycles of this research are then presented and detailed: Cycle 1 as the official Horta & Gastronomía project activities (2017 edition) and Cycle 2 as an intervention conducted after the official activities ended, in 2018. Thus, the second cycle constitutes an extension of the Horta & Gastronomía project in which I made an explicit effort to develop sustainability competencies using arts-informed strategies. After presenting data generation methods, the analysis is explained in terms of how it employed the concepts of Sustainability Competencies and Eco-Art education (presented in Section 2.5 and 2.4, respectively) to analyse two cycles of PAR. Questions of validity and ethics are also presented, addressing my role in the project and as researcher.

### **3.2 An action research project**

This investigation constitutes a case study focusing on an extra-curricular activity - the Horta & Gastronomía Project- conducted at the school where I work. Case studies are adequate when exploring specific contexts with detail and multiple sources of evidence (Zainal, 2007). Since the Project was not structured intending to inform academic research, data obtained from this initial phase was not systematic. Furthermore, the activities approached diverse topics direct and indirectly related to food security. Thus, I developed an extension of the project (an intervention) in order to investigate if, and how Horta & Gastronomía contributed to the development of sustainability competencies amongst participating students. The intervention represented a structured opportunity to observe the key sustainability competencies being used in a real-world situation (See Section 2.5). This second phase allowed a specific issue to be focused, around which the competencies could be mobilized. Thus, I could identify clear action-reflection phases in my research, as found in Action Research (AR; Bradburry & Reason, 2003), an approach which establishes a dynamic interaction between theory and practice (Robottom, 2005). I use this approach in the “struggle to make sense” (McNiff & Whitehead, 2002) of what happened with the group in this process. With this study I try to reflect on the actions I took in these two editions the Project had at that time (See Section 1.5), and subsequently the intervention made, in the light of the framework described in Chapter 2.

### 3.3 Action research cycles

This study uses the strategy of action research with two action and reflection cycles. The first cycle refers to the garden-based activities during the course of the Horta & Gastronomia Project. The activities in this period were carried from my personal, empirical knowledge and were not planned from strong and well-defined theoretical framework but are expected to have stimulated sustainability competencies in the Horta & Gastronomia students. After this, a new cycle was planned considering the key sustainability competencies using eco-art strategies (Fig. 3.1). The following steps of investigation on these cycles may foster the transformation of knowledge: from tacit to explicit, as McNiff and Whitehead (2002) suggest, and moving from an individual body of practices to a collective building of knowledge.

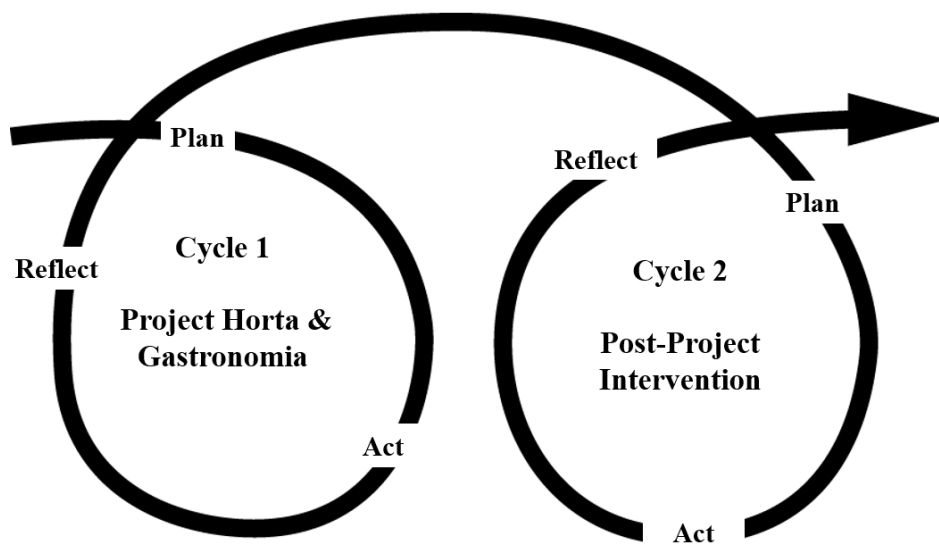


Fig. 3.1: Representation of the action research cycles in this study.

#### 3.3.1 CYCLE 1: The Horta & Gastronomia Project

The average 20 students who participate in the project each year enrol by their own willingness to participate. If the number of people interested exceeds the offered places, a selection is made through interviews to evaluate student interest, experience and availability to stay in the project. In accordance to the high evasion rates at school, some students left the project throughout the year, and at the end of 2017, in the group which was invited to participate in this study, there were about 14 students participating in Horta & Gastronomia.

- **Plan**

Horta & Gastronomia Project is my first experience as an “active” environmental educator, in the sense it is a project in part created by me. Thus, it was built mostly from my previous experiences (See Section 3.8). In my experiences with education in general, by contact with the field of Anthroposophy, and working specifically with environmental education workshops, I learned the importance of a structure of activities that respects a “natural rhythm” which speaks to human nature. One way of adopting this is using the Flow Learning model (Cornell, 2009) presented in Section 2.1 and that influences the structure of Horta & Gastronomia meetings. Every meeting started with some introductory warm-up activities and included the registering by the students. The introductory activities (corresponding to Awake Enthusiasm and Focus Attention in the flow learning), usually in circle, included movement, rhythm, and music, exercising coordination and connection with participants and establishing a defined beginning to the Project in the day.

I tried to address the issue of apparent lack of ownership among the students (described in Chapter 1) through different strategies. In these first moments we also used to include conversations to remind past activities and share news from the participants. Exercising memory together could mean creating stories from their point of view, so I tried to stimulate them to narrate the story that was being lived by the group. By bringing their personal experiences and weaving it to our main project course, I also hoped the sense of group cohesion would be strengthened. Moreover, the overall project structure, different from the common classroom setting, and the moments of discussions called for willingness to look to and acknowledge their own experiences. Students were, in general, first invited to feel their own individualities, then stimulated to reflect about their habits and health and share the reflections with the group. This was often made by what I call “meditations”, used in “Focus attention” stages. These exercises stimulate introspection, developing attention either to oneself (body sensations, feelings, memories) and/or to the environment around. Orienting attention to the outer environment can promote a connection with the place; in this case, the meditations were made suggesting movements related to environmental elements or using them as metaphors. After the moment of introspection, the experience could be shared by conversations, writing or drawing.

Adopting a group notebook as a ludic tool to keep records of the activities and experiences was another strategy to reinforce their ownership. At each meeting, one or two students were chosen to record the activities through writing, photography or some other form, depending on their choice. Therefore, the chosen students had the responsibility to record the meeting but the form of recording was free. The journal also helped since it was not always possible to run a specific “share inspiration” activity at the end of every meeting. Closer to the end of the Project,

a portfolio was elaborated as a final group effort to present their experiences during that time in an artistic form.

The most frequent “Direct experience” moments consisted in work in the vegetable garden or at the kitchen. When planning, we tried to intercalate these two “branches” along the meetings, or to practice them as often as possible. The sustainability-related topics were approached, whenever possible, as hands-on or stimulus to the hands-on activities (garden or kitchen), permeating them. Engaging the body also meant to explore senses other than the vision, generally the most stimulated. On the “smelling bags” activity, the students had to guess what herb or spice was contained in the little bags. Blindfolds were also used, for example, in exercises for strengthening group cohesion, when they needed to recognise their fellows only touching hands.

I established the Project schedule from a logic of “closer”, daily topics to the more complex, large scale, ones. Thus, the first meetings addressed “essential” or introductory topics, such as kitchen best practices (before starting to make recipes) and generalities on vegetable gardens and plants. Since the beginning, I directed practices to tune their perception in order to be receptive and open to discoveries. This included the place (although being there almost daily, many did not know the vegetable garden until then); their individualities (already discussed, adding body and emotions); their habits and relations.

The order of general topics approached was: plant diversity and basics on Botanic; feeding and planning meals; health and obesity; herbs and infusions; feeling of belonging to place; consumerism and chain of production; Ecosystems Ecology; waste and compost; agricultural models and cultural food diversity. After its introduction, a topic was commonly brought in the following discussions. Discussions that were frequently present included feeding habits (and common knowledge associated); desires related to crops and recipes; and reflections on CESMAR’s practices regarding the discussed topics.

Near the winter solstice in June, I planned a meditation to bring consciousness to the influence of light oscillation on us. The activity was intended to stimulate connection to the phenomenon, embodying the oscillation of light depending on the season and attribute meaning to it. The meditation would start with movements of expansion to then contract, concentrating the inner force. While “folded”, I read a poem from Khalil Gibran, and then the bodies expanded again, slowly feeling the physical and psychic reactions. This would be used as introductory activity to explain the light distribution on the planet and discuss adaptations and relations of living beings with differences of light.

Halfway through the Project’s length, I decided to conduct a group evaluation of it, in order to reinforce some agreements about how we were working. I wanted to investigate what they

were feeling and thinking, since we were facing intermittent participation of some students and, as Project organizers, wanted to feel more commitment in terms of frequency, participation on activities, and collaboration with the organization of the place after the activities. Considering that we commonly struggled to establish a dialogue on such issue with them, I proposed this evaluation as an artistic practice: without stimulating overthinking, I appealed to the intuitive use of colours to represent how they felt about the Project. The activity started with a guided meditation, followed by individually painting, using only the chosen colour to fill a sheet, and only subsequently bringing the process to conscience by explaining what was done. After listening to each other, I proposed to use the papers they painted as basis for a group collage representing how we wanted our interaction to be. Thus the group could use the past and present transforming it into a desirable future.

We also included three excursions to offer “experiences of immersion”, in which the participants could be in contact with places of interest. The chosen places were a community garden nearby the school, the Botanical Gardens and an organic farm. The community garden was in phase of implementation, supported by the local Marist university (PUCRS). The support was obtained through a startup contest, an event held at CESMAR and directed to local development. The Botanical Gardens would allow to explore plant diversity and Ecology, as well as to know the work and research developed there. The Botanical Gardens are part of a public organization involved with research and services on biodiversity (Fundação Zoobotânica – FZB) and is recognized as one of the best in the country. Despite this, it is at risk since the extinction of FZB was declared in 2016. Thus, I was even more inclined to take the students there in order to value the place.

- **Act**

The three main axes of Horta & Gastronomia are work in the garden (garden maintenance, seeding, harvesting etc.), cooking, and general activities to address different subjects around sustainability. The cooking or gardening activities could take the time of a whole meeting, whenever possible being contextualized or recalled in the other activities.

The meetings always started with the group in circle. When participating in the meeting, the Physical Education teacher conducted the warm-up in the beginning. The repertoire of these opening activities had some items that were more frequently exercised and familiar to the group. Depending on the day, this initial moment was longer, requiring more movement, and consequently a proportional investment on calming, “Focus attention” activities.

At the introductory meetings intended to inspire on students some intimacy and wonder with the plants and the place, we walked freely, but with “tasks”, or practicing “guided search”.

After a group conversation about prior knowledge on plants, I asked them to observe the patterns discussed (such as plant parts) and register the richest diversity they could. For this, they could write, draw or photograph what they observed – and that was shared with the group afterwards. They could always use the magnifying glasses present in our toolbox. Thus, I sought to stop at some points to indicate things to observe – in different directions, of varied sizes, shapes and colours. An interesting exercise was to observe a small piece of soil trying to identify how many types of plants and other creatures were present there. To foster their place-related feelings, one of the activities consisted in a guided meditation to recreate a special place in their imagination, drawing and then presenting it to the group.

The discussion on health and habits related to food was enriched by parts of the Brazilian documentary “Muito Além do Peso” (Way Beyond Weight), about obesity and industrialized food. Including on the discussions the topic of disconnection from “real” food and our bodies, the topic of herbs and popular wisdom was raised. The group then started to research herbs, approaching it empirically, at our garden, and finding information on the Internet. In this effort, I also asked them to practice observation using the drawing strategy. Later, I brought the “smelling bags” activity, used as a starter for the discussions. The topic of health and integral use of ingredients was further explored at two workshops executed by SESC (an external organization which has some partnerships with the social centre).

To deepen the discussion on health, it was necessary to know the human body and how it works. In this activity (Body building), the group traced the contours of the body from one of the participants and used it to represent the digestive system. I gave the instructions to go straight to this activity, presenting it as a group challenge: they should accomplish the task only using the knowledge they already had. I offered materials such as marking pens, pencils, crayons, post-its and modelling clay. After they presented their building complete, I explained some components using real-size materials, pictures and related data. The nutritionist and the Physical Education teacher were present in this meeting.

To open the discussion on consumerism, it was exhibited the documentary “The Story of Stuff”, which exemplifies the supply chain, questioning the impacts of each step. Then, I divided the students in groups and asked them to choose any object in order to represent in big sheets its trajectory, from the base to discard. The groups presented and the discussion was led by the Sociology teacher.

The topic of consumerism led to the topic of waste. I used photographs from a series showing the amount of materials generated in a four-year period (See Appendix D). In groups, the students started to research about different types of waste, the findings shared afterwards. From this, we started an inquiry and they went investigating waste management at CESMAR,

interviewing specific people that worked in each sector. The findings led the group to identify flaws in waste management and to think of possible solutions. Regarding this topic, we also built composters using plastic bottles that they could take home. Some students had the idea of producing a documentary (also listed in Appendix D) on the topic and presented it to the group near the end of the project.

Finally, we explored kinds of agricultural systems, a topic introduced by exhibiting some parts of the Brazilian documentary “O Veneno Está na Mesa II”, which explores the impacts of pesticides and presents alternative systems. We explored concepts present in the documentary and created a scheme while discussing it. The concepts were later remembered in circle, using a ball to mark who was speaking among the participants. They could recognize the application of many of those concepts when we visited the organic farm.

In the final meetings, they presented their documentary, which is called “Remanescer” (“To remain”) approaching the topic of waste. We then discussed their habits again, how they changed (or not), their learning and perspectives. Some participants presented its trailer at a CESMAR staff meeting, when they spoke about the inquiry process, calling people to engage in the topic to improve waste management. To conclude the learning sequence of the project, we chose two different themes and made “Folded poems”, a collaborative writing to review what was approached.

Before the official closing of the Project, we had a meeting to make a portfolio. This was a final activity for the Project, a way students had to reflect about the experiences from the Project and to represent aspects they thought most important. This output also gave freedom of expression, since they decided the content and the form to be presented. They organized themselves in three groups that planned together to approach different perspectives.

Therefore, the activities included photography (the 2017 group made some posts on the Instagram account created by the previous group), mapping, exploration through senses, meditation, drawing, painting, writing, video production, composter making and an inquiry. Resources such as documentaries and photography were used as stimulus to the discussions, which used to start acknowledging their backgrounds and were then enriched by researches.

The project also included field visits beyond the school garden, to expand students’ perception of the real-life applications of what is discussed and experienced. The visits made in 2017 were to a community garden near the school, to the botanical gardens and to an organic farm; the first within walking distance of the social centre, the second in the middle of the city and the last in the rural area of Porto Alegre.

Another opportunity for improving their sense of agency was the participation on the School Book Fair and the TecnoCESMAR event. We planned together for both events, being a workshop to children with a thematic story created by them to be told on the Book Fair and a spot in the TecnoCESMAR, offering juices and talking to people about sustainability issues.

- **Reflect (analysis)**

The meetings were recorded when possible, by me and the nutritionist, in evaluation sheets (Appendix A). I also had a personal journal to register memories and remarkable events or reflections.

Reflection on this first cycle happens in Analytic Phase 1 (further explained in Section 3.6.1) as a summary of activities applied, considering the Eco-Art skills involved and potential to stimulate sustainability competencies. To do this, I made use of the different records available from the meetings (personal and group journal, evaluation sheets) and observation of the final portfolio production (See Section 3.6.1 and Table 3.1 for a summary of data used in each phase). Photographs were also used to stimulate memory.

### **3.3.2 CYCLE 2: Post-Project Intervention**

Cycle 2 was designed especially for this research, after the end of Horta & Gastronomía regular activities, with the students who accepted the invitation to participate. It consisted in a four-meeting intervention focused in real-world problem solving, in order to investigate the key sustainability competencies framework applied to this case.

- **Plan**

After the end of the activities of Horta & Gastronomía, its participants were invited to participate in new meetings which had the purpose of more deeply investigating the development of sustainability competencies and the possible role of eco-art strategies in this process. After permission from the school (See Appendix B), the invitation was made officially through a printed letter (Appendix C) recalling briefly the research objectives, documents necessary for participation and information on how the meetings would work (See Section 3.8). Also, further stimulation was made through the WhatsApp application (the Project participants had a group there) and personally to the ones whom I gave classes to and used to meet at school, where a brief meeting was held to explain the research.

An intervention integrates what researchers have been calling “design-based research”, an approach which deals with “develop[ing] theories of the process of learning and the means of



supporting these processes” (Penuel, 2014, p. 99). Hence, the key sustainability competencies framework, as well as the activities used, could be investigated, applied in a “real-world problem” (Wiek et al., 2011, p. 204). My idea for the intervention consisted in bringing the students together in order to plan uses for the space of CESMAR, a realm relatively open to improvement proposals. The three units in CESMAR are in the same land and students and community users share the space, so the changes would impact a reasonable number of people. I planned four meetings for this new cycle in order to follow steps that would allow the observation of the key competencies. Each meeting would correspond to each of the following goals: Identify the problem; Map the current situation; Idealize scenarios; and Plan action.

This post-project intervention in Cycle 2 constituted an opportunity for the students to act on their place. We gathered information, reflected and discussed the place they live in and planned strategies to transform it in some direction closer to what they believe is a healthy, sustainable and pleasant community. This process can be a way of being more in power of their lives, to feel that they can do things – in other words, developing agency. Here I refer to interest about their world and capacity to make difference (Payne, 2015).

Identifying the problem and Mapping the current situation are two steps that require them to face and think about their reality, opening a possibility to strengthen their bonds to the place or redefine them. Discussing current issues at the community and sharing information and stories can stimulate most competencies. When presenting problems, students can be in contact with and reflect about their values, indicating normative competence. When mapping the present, stories can be shared, making their history tangible, surfacing anticipatory competence, or as Johnson (1994) illustrates, “our history is a window on our relationship with our place... some great advances in knowledge have come from our ability to read the past” (p. 40). All these cues, used to comprehend reality by different views, are also comprised in systems-thinking competence. This process of collectively building an outlook of their reality, contacting their perceptions, builds interpersonal competence.

The intervention, then, represented an opportunity to further stimulate the development of sustainability competencies not reduced to a moment of assessment. This stage also let me apply some new eco-art activities, thus enabling to explore my interest in how eco-art might help develop sustainability competencies.

- **Act**

The intervention consisted of four meetings as an extension of the formal Horta & Gastronomia Project, lasting between two and three hours each. The meetings happened mainly in a school room and included tea breaks. Following the tradition from the Horta &

Gastronomia meetings, I started every meeting at the intervention with open warm-up activities before getting into the directed discussions and activities focused to the main topic being explored.

The first meeting - “Identify the problem” - had the purpose of putting the students in contact with the topics addressed at the Project again and building an overview scenario of critical issues faced by the community. The opening activities consisted in movement games learned at the Project (analysed in Cycle 1; see Section 3.3.1). As soon as I explained the plan for the intervention and asked them to start thinking about the issues in the community at the beginning, they recalled a documentary produced by them as a school assignment. We watched it, as well as a trailer of the documentary they produced while at the Project (See Appendix D for links to the videos). Considering videos as potential eco-art resources, the video exhibition and the discussion afterwards was analysed as Activity 1. Activity 1 consists in presenting examples of eco-art and was applied afterwards as previously planned by me. Since they brought the visual, artistic resources to exemplify what was meant, this was included under “Activity 1” label. The difference lies on who brought the stimulus.

The video exhibitions stimulated the first part of the discussions about the community and a brief recall of Horta & Gastronomia activities (I took all the materials produced during the Project, including the group journal). The discussion generated a sheet/scheme linking different, but connected problems identified by the students (Activity 2). Afterwards, I brought up Activity 1 showing some examples of environment related interventions so they could be stimulated to think more practically in terms of responses to the issues identified. The presentation included examples of environment transformations including the *guerrilla gardening* movement, artworks from eco-artists, a trailer from a documentary on artistic uses of waste and a video from a photographer showing tiny living beings<sup>3</sup>. Then, a discussion was conducted to reflect on which of the problems mentioned could be addressed by the group. One particular place recurrently appeared throughout the discussions. That was a stream that runs through the community, which we refer to in Portuguese as a “valão”. Thus, the students decided to elect it as the central topic of the inquiry, changing my initial idea of keeping the action in CESMAR. From this, I asked them in the final moment to express their feelings related to the valão on paper (Activity 3).

The second meeting - focusing on “Map the current” - started with a clay activity (Activity 4). Clay is a dense material, which I thought could stimulate their physical effort into shaping something concrete, embodying the call for action. Therefore, it also can serve as a

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<sup>3</sup> Alan Sonfist, Rob Kessler. “Lixo Extraordinário” (by Lucy Walker, João Jardim and Karen Harley) “Micromundo II” (See Appendix D for details)

“grounding” strategy to focusing. In circle, the instruction was to shape a sphere with eyes closed, staying attentive to the features emerging on the sphere, in an attempt to explore senses other than vision. After shaping, the spheres were exchanged among each other, a step which I thought could work into their sense of attachment and openness to features from others, addressing interpersonal features. After the process, we discussed perceptions about the experience. Using clay had the objective of stimulate in them the desire to effectively take action (embodying it by building something concrete - the sphere was a symbol for the result), and following exchanges and movements would make them reflect on their interactions.

Following this, we ran an analysis of the drawings made in the previous meeting (Activity 5), with each person speaking about other’s drawing, and the impressions and feelings were discussed. The group further explored the “valão” issue in Activity 6, when I asked them to write down “things you get from the valão”: any relationships, feelings, and roles of it. Thus, we could surface their impressions and knowledge, making a more conscious notion of the place that the valão has on their imaginary domain. A map of the valão started then to be made in craft paper (Activity 7), through many discussions about its path. In this effort, we used their experience, printed maps and Google Maps. Along this process, they brought ideas for their own possible actions towards improvement of the place and discussed actions already taken by others.

Third meeting – “Idealize scenarios” - started with a meditation (Activity 8) using the images of rocks and turtles. My intention with this activity was to focus attention by stimulating their imagination in a relaxed way. This could touch their anticipatory competence, involved with creation of future scenarios. To exercise more directly this and the normative competence, I proposed a collage activity (Activity 9) in order to exercise and identify how they wanted the water stream to be. For this, I brought the drawings they made at the first meeting representing their current perceptions about it and suggested that they used it to compose the ideal scenario. My intention was to turn transformation (current to desired state) into a more visual process, working openness and their sense of attachment again. Afterwards, we kept Activity 7 mapping with some coloured paper with which they could represent different actors and places that influence the water stream.

The last meeting – “Plan action” - started at the water stream’s borders. We were able to go out after unfavourable weather conditions in the second and third meetings. I started with a moment of contemplation and poem reciting around the theme “water” (See Appendix D) with the students seated on the grass at the borders of the valão. We could investigate the map they printed from Google Maps and walk along some path following the valão course. Being present in the place allowed us to observe many aspects discussed on the meetings, such as vegetable

gardens on its borders, garbage, sewage pipes and the recycling shed. Back to school, we marked some important points on the printed map and discussed ideas for action, which each of them had previously registered (activity 10).

- **Reflect (analysis)**

Cycle 2 counts with two analytic phases: 2A and 2B. The activities applied on the intervention are addressed in analytic phase 2A and analytic phase 2B focus on searching the emergence of sustainability competencies along the intervention meetings. These are further explained in Section 3.6.2.

### **3. 4 Data generation methods**

#### **3.4. 1 Observation**

One of the challenges of action research is how to stay attentive while acting out our own teaching practice. Or, as discussed by DeWalt and DeWalt (2011), how to observe and participate at the same time. In the moments with the students, I tried to manage the two tasks: the external one of proposing activities and conducting moments; and grasping the moment, which I consider more introspective. I moved from complete participation (in the sense that I was working at CESMAR for two years at the point this research started and I was myself the creator of the project studied) to moderate participation at moments when I wanted to give students the freedom to act by themselves during the activities (DeWalt & DeWalt, 2011). My role in this action research context (See Section 3.7) allows the use of participant observation, a process described by Arhem (cited in DeWalt & DeWalt, 2011) in a way that aligns with action research. Instead of “participant observation”, he uses the term “participant reflection”, which demands the moving dynamics of participation (being in, with the context) and reflection (taking oneself out of the context). Thus, I consider that my process resonates with “participant reflection”, if viewed as associating “action” and “reflection”, as adopted in AR.

Data was captured through video recording. In Cycle 1, observation happened at the portfolio production stage and was video recorded, then transcribed. This step generated a 1 hour-video. Its record was transcribed from video and organised in three different documents, since three groups were formed and worked at the same time. Observation in Cycle 2 was made during all four meetings, totalling almost seven hours of video. Videos from the intervention meetings were transcribed covering all events and discussions possibly relevant to the research questions. All transcriptions were later translated to English.

### **3. 4. 2 Document analysis**

Document analysis is specially linked with a case study approach, and is used to gather additional data (Bowen, 2009). In this case, it was used to build a picture of the activities presented and project processes, as well as students' records of their learning. Most project activities were recorded either in the group notebook, my personal journal or evaluation sheets, filled together with the nutritionist whenever it was possible. This set of documents was generated in Cycle 1, while Cycle 2 included document analysis of the outputs generated during the intervention meetings.

### **3. 4. 3 Personal journal**

I used the personal journal as a space to plan and a way to keep record of the events and details that caught my attention, as well as some reflections and reminders. I did this also to help the planning of the project in its subsequent editions. The notes, however, were not uniform, and the meetings had different volume of information about them. Adopting a journal as data source in research resonates with the reflexive process, associated with Action Research (explored in Section 3.2), which supports a harmonic weaving between theory and practice – or the search for making sense, as described by McNiff and Whitehead (2002). Adopting this strategy represents acknowledging that the research process is not linear, neutral or unproblematic (Ortlipp, 2008), recognising that the researcher's subjective world affects the research itself (Malacrida, 2007).

### **3. 4. 4 Focus group**

A focus group happened after the four intervention meetings. A focus group is an opportunity to find answers and positions collectively, discussing topics in a “natural” way, if compared to other strategies such as interviews or questionnaires, for example (Slocum, 2003). This data generation method was used to help participants to remember the project, discuss the activities used and their structure, as well as discussing learnings and changes from the project. This strategy was used to get feedback on project activities (Cycle 1) and on the intervention (Cycle 2).

### **3.4. 5 Summary of Data Analysis Phases**

The data to be used in this research comes from the observations of official and extension activities of H&G Project. A focus group at the end of the process and recording material are also used. Each moment generated data using the data generation techniques

described as follows. Table 3.1 presents how data generated is used according to analytic phases.

Table 3. 2: Data used in each action research cycle. Labels and categories of analysis are also shown.

Cycle	Analytic phase	Purpose	Data/index	Categories
1	1	Review first cycle of the H&G eco-art activities and their potential to stimulate sustainability competencies	Personal journal [PJ] Documents: <ul style="list-style-type: none"> <li>• Evaluation sheets [ES]</li> <li>• Portfolio</li> </ul> Observation: <ul style="list-style-type: none"> <li>• Portfolio production [PP1, PP2, PP3]</li> </ul> Focus group [FG]	1. Theme 2. Aim (in, about, for) 3. Rationale 4. Eco-Art Skills 5. Data 6. Expected Sustainability Competencies
2	2A	As above in analytic phase 1, but for activities used at the intervention	From intervention meetings: Personal Journal [PJ] Observation [OI1, OI2, ...] Focus group [FG]	Categories as 2-6 above
	2B	Identify emergence of Sustainability Competencies	Same as above	Wiek et al.'s Key sustainability competencies

### 3. 5 Data management

Raw data was organised in physical files (in the case of outputs and documents produced) and scanned into digital documents. Data was stored in personal computer and backed up in memory cards and Google Drive folders. Labels to data from different origins are summarized in Table 3.1.

### 3. 6 Data analysis

Data analysis is divided according to the action research cycles of this study. AR process is open-ended, suggesting continuity, and “mak[ing] sense is an ongoing process”, where “we never get to a point of closure” (McNiff & Whitehead, 2002, p. 103), suggesting that a complete and exhaustive analysis is not possible. Cycle 1 deals with Project Horta & Gastronomía and comprises Analytic phase 1, which focus on the eco-art activities used in this period. Cycle 2 includes the post-project intervention and is subdivided in two analytic phases. Analytic phase 2A deals with the activities used in this part and analysis phase 2B explores the key sustainability competencies of the group. The cycles are summarized in Table 3.1.

### 3. 6. 1 Cycle 1 – Analytic phase 1

This phase aimed to systematize the activities that used eco-art strategies applied during the 2017 project, linking it to the key sustainability competencies. The analysis used the following data: personal journal [PJ]; evaluation sheets from the project meetings [ES]; group notebook; transcriptions of portfolio production (transcriptions coded as PP1, PP2 and PP3 according to the different groups that worked together at the time) and from observation of the intervention meetings and focus group, when students referred back to project activities (See Table 3.1).

This analytic phase made use of an analytic memo [AM1] for organising the data (See Appendix E). Activities using art strategies applied in the project were analysed, combining different aspects of them. This memo used the following five categories for analysis: The environmental ‘theme’, in/about/for the environment, description of activity, its rationale, its results or evaluation, sustainability competencies, and eco-art skills. Below I elaborate on how each of these categories was selected for analytic purposes.

The environmental themes are used to contextualise the issue being addressed, since the key sustainability competencies are directed to problem-solving (Wiek et al., 2011). These themes were delimited from the Brazilian policy on Food and Nutrition (See Section 2.6): Essential needs; Cultural diversity; Environmental sustainability; Economic sustainability; Social sustainability; Production; Distribution; and Consumption, being the last three streams of “sustainably produced food”.

The activities are also classified regarding Inwood’s (2013) framework, adapted from Palmer’s (2002) in, about and for EE streams (See Chapter 2). Inwood (2013) explains the labels applied to eco-art as follows: learning *in* the environment represents nature as site for art-making or exhibiting art; learning *about* the environment either consisting in art created with natural materials, with the 3Rs or using nature as subject for art; and learning *for* the environment related to viewing and critiquing eco-art as activism.

The key sustainability competencies were analysed by reviewing the rationale, and any observed sustainability competence after its execution (See Table 3.2 for a list of sustainability competencies and indicators for each). Therefore, the analytic memo contains a “Expected sustainability competence” column and data related to it is included in the “Data” column. This column is a synthesis of activity feedbacks and/or results, where data sources are mentioned after the quotation. The sheet also includes eco-art skills or concepts involved in each activity, using Inwood (2013) as model. These skills include collage, colouring, composition, drawing, form, painting, sculpting, shape, texture, and video production. The “Rationale” column also

includes information on how the activity was used according to Cornell's Flow Learning model (2009).

### **3. 6. 2 Cycle 2**

This phase deals with the post-project intervention. It looks at the emergence of competencies when dealing with the chosen "real-world situation" at the meetings (phase 2B) and investigates the role of eco-art strategies on it (phase 2A).

- **Analytic phase 2A**

Phase 2A from cycle 2 aims to summarize the activities implemented at the intervention, through analytic memo and coding as done in Cycle 1 analysis (See Section 3.6.1). Since the activities in Cycle 2 of this research were directed to the investigation of the chosen topic, the analysis at this phase does not use the "themes" as a category. This phase used data from observation of intervention meetings and focus group, organised in analytic memo 2 [AM2].

- **Analytic phase 2B**

Phase 2B from cycle 2 focuses on evidence of the presence of sustainability competencies as developed by Wiek and colleagues (2011; see Section 2.3). Data from the intervention meetings [OI1, OI2 and so on], personal journal, evaluation sheets and documents produced [IP1-1; IP2-1, ...] were organised in two analytic memos (See Appendix F; AM3 and AM4).

The two analytic memos explore the same questions, but AM3 was used to gather results and insights from the activities before the main theme of interest was chosen. Since the discussions before the choice touched diverse topics, this memo contains "Theme" and "Level" rows also used when analysing the activities (analytical phase 1: Section 3.6.1). From the point that the valão was the theme being discussed, these two rows were not necessary and AM4 was used.

This phase of analysis uses three "levels": Garden, Home and Society. The Garden label was given when the aspect discussed involved happenings at the institution level. The label Home was used whenever they mentioned aspects of their daily lives outside the social centre, while the Society level was used when they reflected about trends that are not necessarily of their personal lives and that happen outside institution.

Approaches to assessment of sustainability competencies were described in Section 2.3 and include tests, either applied externally or by the participants themselves. In this study, I



chose to run a descriptive analysis of the competencies, due to the small number of participants and to the kind of study developed (as described in Section 3.2). Descriptions or excerpts were included in the analytic memos using Wiek et al.'s guidelines (2011) as follows in Table 3.2:

Table 3. 3: Indicators of sustainability competencies (drawing on Wiek et al., 2011).

<b>Competence</b>	<b>“Indicator”/actions</b>
Systems-thinking	“comprehending, empirically verifying, and articulating their [complex systems] structure, key components, and dynamics” (p. 207)
Anticipatory	“collectively analyse, evaluate and craft rich ‘pictures’ of the future related to sustainability” (p. 209)
Normative	“collectively map, specify, apply, reconcile, and negotiate sustainability values, principles, goals, and targets” (p. 209)
Strategic	“collectively ... designing, testing, implementing, evaluating, and adapting policies, programs, and action plans” (p.210)
Interpersonal	“motivate, enable, and facilitate collaborative and participatory sustainability research and problem solving” (p.211)

Learning objectives for novice level proposed to Wiek and colleagues (2015) were also used to search indicators of sustainability competencies (listed in Appendix F). According to the authors, this level could be used at high schools.

### 3. 7 Validity

Validity enables knowledge production from research that generates believable findings (McNiff & Whitehead, 2002). It is closely associated with a clear notion of what the research objectives are (Newton & Burgess, 2008).

Conducting this research, I had to deal with different roles: personal, researcher, teacher and practitioner. I must be attentive to points that could influence the research, such as my emotional involvement with the project and the students. I met the group that participate in this research in the occasion of Horta & Gastronomia meetings, and not as the Biology teacher at the school. This probably made a difference in the way we built our relationship - if compared to a classroom, in a relaxed setting, were we could develop some level of intimacy. I will not be exaggerating in affirm that the project, and the subsequent meetings, had an environment of relative openness and joy. Along the process I repetitively brought the idea of processes and discussions where all experiences were welcome. This addresses the democratic validity explored by Anderson & Herr (1999) and probably minimised power relations such as the one

created by the presence of a “critical teacher” or an “inquiring researcher” that holds participants from expressing themselves sincerely.

Triangulation is a strategy to approach the research focus from more than one point (Flick, 2004). As documents are not always precise and complete recordings (Bowen, 2009), information from the different documents and other data sources were combined when transferred to analytic memos, linking information and/or organising it in established categories (See section 3.6 and Table 3.1). The data produced either from me and the other educators and from students inputs contribute to the triangulation process.

Another view of validity that is relevant for this work is the one brought by Patti Lather (1986). Catalytic validity deals with the research’s potential to inspire change in the studied context. It is important that the research process is engaging in enabling its participants to reflect on and improve their reality. I believe this is true for this study since daily habits and conceptions were regularly questioned in Cycle 1 and a topic of interest was chosen from their concerns about the reality they live in Cycle 2.

### **3. 8 Ethics**

I come from a scientific field (I graduated in Biology), so I have adopted a strong rationalist view. At a certain point, I started to get in contact with strategies and pedagogies (such as Waldorf pedagogy) which show that humans are more than their brains. I am still trying to conciliate “hard science” contributions and fields that value subjectivities. Nowadays I avoid the empty belief that a scientist owns an absolute truth, and for that I adopt the participatory approach to make the process clearer and as democratic as possible with the students who participated in this study. Following these principles of transparency, preliminary explanations about the research were made (See 3.3.2 – Plan). Additionally, in the beginning of the first meeting, the participants hand in the parents’ permissions (Appendix G) and signed the consent form (Appendix H).

In relation to anonymity, the participants declared to prefer having their faces and names revealed, during the intervention (third meeting).

Regarding Pain, Whitman and Milledge’s (2011) considerations about PAR process, I plan to keep committed to research transparency to the community it explores. I would like to share this research’s process in an open meeting at the school, and maybe also organise a precursory meeting with the research participants to discuss the findings. From this, the group (also considering myself as a group participant) should be able to devise what changes are needed in the situation that was investigated (Pain, Whitman & Milledge, 2011). From this, I

must acknowledge the need for a continuation, something as a “third cycle” of action research, which would be the effective implementation of the ideas created at the intervention (See students’ declarations about the matter in Section 4.3.2.7).

### **3. 9 Conclusion**

Research design was delineated as a case study of an action research with two action and reflection cycles. These were used to “make sense” of a process that started as an extracurricular project – Horta & Gastronomía project, comprised in Cycle 1. Key sustainability competencies and eco-art frameworks were used to follow with cycle 2, which included an intervention where the group could investigate a “real-world problem”. Analysis is split in three phases according to cycle and research question, using data from the documents produced, observation and the focus group. Research validity is discussed explaining positionality and the concept of catalytic validity.

## CHAPTER 4 – RESULTS AND DISCUSSION

### 4.1 Introduction

This chapter narrates findings from the two action research cycles in order to address the two research questions presented in Chapter 1. The eco-art activities applied during the Horta & Gastronomía project (Cycle 1) are divided according to Inwood's classification of *in*, *about* and *for* the environment. The activities used, as well as outcomes of them, in the post-project intervention are explored following each intervention meeting. The chapter ends associating the topics in the meetings with the key sustainability competencies framework and the eco-art strategies used.

### 4.2 Cycle 1 – Horta & Gastronomía Project

This section explores the art-informed activities applied in Cycle 1 of this research, which “Act” stage corresponds to the Horta & Gastronomía Project. The data showed in this section was approached in analytic phase 1 (as described in Section 3.6.1) and is organised by the classification of activities *in*, *about* and *for* the environment used by Inwood (2013) and explored in Section 2.4.

- **Activities *in* the environment**

The activities applied *in* the environment were, besides the hands-on work in the food garden, the introductory, warm up activities. These are the following: group clapping/body games; meditation; feeling light cycles and smelling bags.

For being applied regularly, the introductory activities turned into a sign of the project. The students established a connection between the project and the movements exercised in these moments: “*It's not Horta & Gastronomía without clapping*” [PJ06]. When arriving at the place we used to meet, sometimes the students started to “send me claps” from distance, as if welcoming me and marking the beginning of the meeting [PJ06]. These activities were also readily remembered at the focus group, when I asked about activities [FG 4-122]. When starting the first intervention meeting, the students spontaneously suggested some of the activities they liked more [OI1 1-29].

A specific meeting was emblematic regarding the effect of the introductory activities. On that day, a series of assaults happened near the school. The students were concerned about that and the atmosphere was heavy. Some were late, others left for being too nervous. We made the series of movements and games and an exercise of silence. I wrote on my personal journal [PJ13] that on that moment we could get calmer and pointed to the strength I felt by “*staying*

*together in silence*”, very close to each other in a pleasant environment. I noticed the silence following my explanation about the next activity (Evaluating through colours). Some students arrived late while the other activity was being applied and I conducted the introductory activities with them. *“it helped to ground and adjust their mood. ‘take the bad vibe out’, Me said she was needing that”* [PJ13]. Later, I also noticed promptitude in participating of the following activity.

The students point out that this kind of activities improves group interaction: *“Caroline -If we didn't do the dynamics, which were very shameful, we would have been embarrassed for much longer, because we wouldn't have talked so much. Amanda – We wouldn't have gotten close to some people we never spoke to.”* [FG 15-474]. Besides the group realm, Amanda also indicates its role in preparing the person to the meeting, which happened after lunch: *“This helps raise your self-esteem as well. Like you're dying there, tired, sleepy, and then there's this kind of fun play and in a little while you're there like this [dancing]”* [FG 14-471].

These quotes indicate that the outer movement provided by the games reflects on inner movements, dismantling states such as the embarrassment cited by Caroline. By experiencing together this moment of play, the students feel confident to experience the other activities. Therefore, learning should be boosted when these states of relaxation and openness, described by Nitecki and Chung (2016, as discussed in Section 2.3), are achieved. The “self-esteem” cited by Amanda resonates with the authors’ identification of play as constituting one’s “internal places” and conferring safety to those, since there is no “right” or “wrong” in this territory – it is all about experiments.

The meditations in the woods were remarkable moments to the students; the experience was included in the final portfolio produced (Figure 4.1) and recalled during the intervention [OI1 18-549] and at the focus group [FG 2-60]. The meditations, tuning the senses, represented clearly embodied experiences: at the focus group, they could still remember strong stimuli such as a bad smell [FG 2-54] and an ant bite [FG 3-72]. In one of the occasions, we listed all the sensations identified; among the sounds in the place, their breath, the wind was mentioned, sensed by listening it on the leaves and on their own bodies [PJ 05]. They expressed the positive impact of the “contact with nature”, being in peace [OI1 18-549] and even “hearing the plants” [FG 2-53].

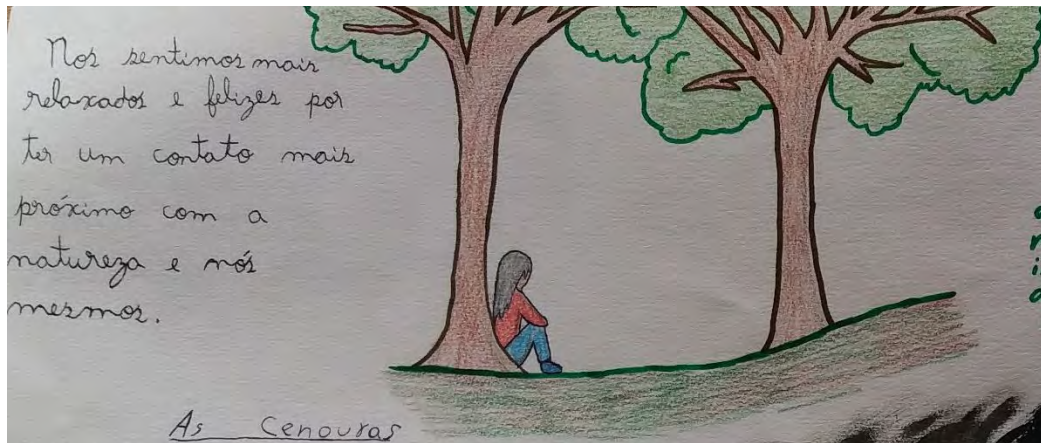


Figure 4. 1: Detail of a page from the portfolio produced by the group. They wrote: "We feel more relaxed and happier being closer to nature and to ourselves"

The topic of temporal and spatial light distribution was approached only by the introductory Feeling light cycles activity (Focus attention); deeper, cognitive exploration of it was not possible due to lack of time. At the subsequent moment of sharing the experiences of it, one student spoke that the moment was intended to make them feel like seeds [PJ 04], a metaphor for the times of rest and introspection before blooming in spring. Even not being possible to execute the Direct experience moment regarding this issue, I noticed that some students were discussing Earth movements later that day, as registered on this same day in my personal journal.

- **Activities about the environment**

The activities *about* the environment were body building; drawing of special place; feeling light cycles; folded poem; group journal; plaques for the garden; recipes; schemes; smelling bags; story writing; evaluation through colours.

The Drawing of special place was a Focus attention activity that followed a meditation. Intending to address place attachment, I conducted the meditation asking them to go back to a place where they felt good or that had an affective meaning to them, paying attention to every possible detail of that moment. Through the drawing, they represented that place and then we shared the stories with the group. On ES01 we registered that they took half an hour to draw and I can remember feeling a kind of anxiety to manage such time, which seemed long to me. When finding those drawings again on the focus group, Caroline criticised the quality of the outputs, mentioning a feeling of “rush” and the group dynamics: “*We couldn't do something nice, it always turned out ugly. We'd do it, and it always turned out like some ugly drawings. I think it's because we had to do everything kind of in a rush and sometimes we were talking and drawing [at the same time].*” [FG 21-706]

The Body building was used as a Direct experience activity in a meeting which had health as subject. The objective of that meeting was to enhance knowledge about the digestive system and make the students able to better understand how food choices impacts the body functioning. The activity was presented as a challenge to them, where they should collectively represent the system on a model of the body drew from one of them. Afterwards, we reviewed the output with explanations and connections to daily life by the educators (me, Physical Education teacher and the nutritionist). The activity involved drawing, sculpting, shape and texture as eco-art skills.

A remarkable point of that day, to the students, was the process of the group of discussion, agreement, and representation of knowledge at the task. On that same day, they indicated the satisfaction with this process's "freedom of expressing the knowledge and identifying errors and accomplishments" [PJ 07], and again a year later at our focus group. In that occasion, they remembered how the discussion went, touching relations between parts of the body, and stressed their "errors" (Sabrina, drawing - *This is a little body on a sheet. Our wrong sheet. If I put the heart in the belly it will be right.* Caroline – *No, it wasn't this. It needs to lack organs.* [FG 5-148]). Another point remembered from that meeting was the representation of the real extension of an intestine in a line [PP1 11-347].

The schemes supported group discussions, making visual the main discussed topics. They were used after watching the documentaries on consumerism and agricultural systems. This strategy can be faced as Direct experience or Share inspiration, depending on the context. The one on consumerism was made in smaller groups of about three people and then presented to the rest of the group, and the one on agricultural systems was made by the whole group while I conducted an explanation about the points approached by the video that they recalled. Exploring the topic of consumerism, the students should represent the supply chain of any chosen product, after watching the documentary. Afterwards, they presented their processes with the group. Here we can identify a more "Direct experience" moment, when they reconstruct the supply chain in the smaller group, and a "Share inspiration" moment, when telling the larger group about it.

Evaluating through colours was another Share inspiration activity, directed to the group dynamics and Project processes. As I describe on my personal journal [PJ13], it was undertaken on the day that the assaults happened. The atmosphere was heavy and I believe this contributed to many of the absences that day – a point that already had motivated me to develop this activity and that I wanted to address with them. Due to the circumstances, the introductory movement and grounding activities were especially important that day (as explored in the previous section – Activities *in* the environment). I registered their readiness to share their impressions with the

group after the first steps (meditation and painting). Different colours appeared among the students from the diversity of their feelings regarding the project. Some of the representations included purple to represent change and orange as a result of the joy of yellow and the kindness of red.

In this meeting we had, besides this activity, kitchen and garden practices. We had too many activities and the group spontaneously dispersed between them. Some students that were not even part of the project appeared and I directed them to take care of the kitchen while I conducted the activity. After the first sharing in group, I attempted to stimulate reflection on the group and attitudes, from what they exposed more directly what they were thinking about that. When we would start the collage step (using their paintings), they were still wet, so we alternated moments between the kitchen and the evaluation. The enthusiastic ones started to cut shapes for the collage while the group ate. They were starting to compose a nature landscape and I intervened to bring conscience to what they were meaning with that. We were evaluating our attitudes, but I registered that some of them were being repeated:

*“The girls started to make plaques. Three models arose from milk boxes and plastic bottles. I required them to organise the material but not everyone did this. Al wanted to glue the paintings on the sheet and was getting impatient, didn't want to go to the garden. Ju swept the floor and did the dishes and commented that she was doing everything. I started to hurry them to go to the garden. He organised our box when I mentioned it.”* [PJ13]

Later I asked myself if I discouraged them and their process of creation by being rigid and remembering the objective of the activity, asking again about the project and the process of evaluation. I made a note about the need of developing *“also the other side: sound, music, movement”* [PJ13].

The Group journal was a Share inspiration strategy used along the whole project. Although they got excited sharing ideas about it (on the day I brought it for the first time: *“LM took the notebook home because she wanted to draw [on it]; she and others suggested printing pictures, adding recipes, etc.”* [PJ04]), I found them somewhat resistant to taking notes on it regularly. I had to rethink my strategies for approaching it, since *“it took long until they got willing to write”* [PJ04]. Often there were no volunteers to be responsible for the notebook each day, so I used to choose the ones at the beginning of each meeting. Intending to enhance attention and dedication to the experiences at the project, I thought in defining these only near the end of the meeting [PJ12]. The lack of constancy regarding the Group journal usage gave some of them the idea of it being unnecessary, *“because none of us barely ever wrote [on it]. It existed just to exist”*, as Sabrina said at the focus group [FG 21-718]. Amanda recognises its



purpose of keeping memories of experiences and their ideas, and the others agreed that it could be a useful tool if used regularly [FG 22-730]. We struggled to keep these records rigorously, and Caroline guesses that one explanation for this was their “laziness” [FG 22-726], illustrated by Sabrina: “*sometimes I forgot the notebook, sometimes someone didn't bring it... sometimes the person would take it home to write and not do it or write and not bring it back...*” [FG 22-727]. A regular notebook seemed to be a heavy burden, and Amanda regretted its use in the next group. She helped run the 2018 edition and made efforts to register the activities: “*This year I started writing it down and the notebook disappeared. To this day I'm still very sad, I wrote it all down for nothing*” [FG 22-721].

Another Share inspiration activity was the Folded poem, during the final meetings. This activity mobilised various issues discussed along the Project and exercised writing, this time focused on a collective endeavour. The activity allows spontaneity, since you only need to complete one preceding sentence with whatever feels appropriated (or matching). Being part of a group sequence also gives readiness to the process, which gets dynamic. As they reported at the focus group, they feel that drawing is an easier form of expressing knowledge compared to writing. The resistance to write among the students is commonly observed at IJB high school. As Amanda says, “*you would be asking too much, right [to write a poem about a topic]... it takes a long time to make, to think, to write...*” [FG 21-732] Caroline reinforces the bigger effort that writing represents: “*It takes a lot longer and turns out a much worse result. Because we can't write a poem properly*” [FG 21-738]. With the Folded poem, however, they easily produced pieces as a group in a light way. They mentioned a similar activity they experienced at a school workshop on creative writing and agreed that doing it in group turns writing easier and funnier. This kind of activity can reinforce learning and strengthen group bonds, as Amanda noticed [FG 22-751].

- **Activities *for* the environment**

The activities *for* the environment consisted of Composters, Plaques for the garden, Pictures to sensitize, and Video production.

Plaques and composter making were Direct experience activities directed to practical solutions in the environment. We tried many types of plaques to identify the plants in the garden, mostly using reusable materials. At the time that we were exploring the topics of waste and of matter and energy in ecosystems, the portable composters were built using plastic bottles and were taken home by them. Some mentioned to have implemented or consolidated the habit of using organic waste at home to make compost and apply it on the plants [FG 16-567].

The activity of video production happened by their own willingness as an outcome of the explorations of the topic of waste, which include the inquiry process. As such, it is classified as a Share inspiration activity. The “Remanescer” documentary shows part of the trajectory of some products, presenting two alternative scenarios to it. It brings data on waste destination and services, presenting the situation in the community (amounts of waste exposed in common spaces and the recycling shed near the school).

### **4.3 Cycle 2 - Post-Project Intervention**

This section explores the activities applied in Cycle 2 (through analytic phase 2A) and subsequently presents indicators of the key sustainability competencies found in the intervention meetings (analytic phase 2B).

#### **4.3.1 Analytic phase 2A - Intervention activities**

This section presents the activities applied in Cycle 2 of this research, with data organised from analytic phase 2A. Outputs of the activities are exhibited in Appendix I.

The discussions on the first meeting, “Identify the problem”, were launched by their videos: “Quem somos nós?” (“Who are we?”) shows the community and is guided by reflections of some of its dwellers, while “Remanescer” (“To remain”) raises discussion on waste (this one analysed under “Activities *for* the environment” in Section 4.2). The discussion included reflections on community feelings and values, which also reflected at the school (further explored in Section 4. – Values at the community). Along the discussions, we recalled points experienced in the Project. From the discussion, we created a scheme linking the topics they found relevant in the community – Activity 2. The output from this activity is shown in Figure IP1-1 in Appendix I.

Presenting examples at the first meeting was an “experience the visual” activity (Irwin & Chalmers, 2007) that raised some discussions. The “Micromundo II” documentary exhibited enabled a perspective change, since it explores life in a small scale, which we are not used to paying attention to. This visual strategy stimulated reflection on some human values, comparing us to other animals:

*Hector - I think we have a quite egocentric worldview from the human point of view, like wow, we are the world owners, but in fact wow, we are not. I wonder if there are animal slums. (...) Do you think they have problems like ours? They live in community. I don't know, if one has more possessions than the others. Like an ant having more seeds, more leaves than the others. [OI1 23-756]*

When presented to one of Alan Sonfist’s interventions, Hector revealed a dichotomic view when expressing his disapproval. The artwork consisted in leaf-shaped benches,

*“something so beautiful and natural”* [OI1 24-780] transformed into a human artefact. This opposition between “human” and “nature” also appear later in their collage creation and in their representations of the valão (Activities 3, 5 and 9; all discussed below).

The presentation of the Canadian project De-fence surprised them and generated comparisons with the Brazilian reality regarding public security. The example of a movement engaged in quitting fences offered a contrast with our over-fencing movement in Brazil. This discussion is analysed in Section 4.3.2.2 exploring CESMAR’s role.

Activity 3 generated drawings representing their perceptions associated to the valão. From these drawings, direct and abstract aspects could be observed and discussed in Activity 5, in the next meeting. All drawings (See Appendix I) included either garbage or expressions of negative emotions. The direct aspects are the ones observed in that place, such as garbage and pollution. The abstract aspects are about feelings and impressions related to the continuity of the situation, either causes or consequences of it. Among them were cited crisis, danger, death, wastage, despair, neglect, and disunity. In many of the drawings, oppositions can also be identified: happy and sad, defined lines separating “clean” and “dirty”. The drawings present dualisms, depicting transformation of water and representing living and vibrant elements along with the destruction caused by dirt and pollution, which seem to compete with life. The analysis of these outputs in the following meeting (Activity 5) also raised discussions about their perceptions of human relations with the environment (further explored in Section 4.).

At the meeting which started with the clay activity I did not have any assistant with me, so the group was helping me to manage the material and the recording equipment. In that bustling atmosphere, the students started to handle the clay before I started to conduct the activity. When I signaled that to them, Hector said that they did that just by imitating me [OI2 1-14], as an unconscious response. I began the activity by calling the state of presence exercised in all our meetings since the time of Horta & Gastronomia, especially developed on the Focus attention moments. Apparently, the grounding was not enough, since many of them did not follow the orientation to handle the clay with eyes closed [OI2 1-32]. This guiding intended to create an opportunity to expand their “sensitive perceptions” (See the discussion of this topic in Section 2.2), establishing a relation of intimacy with the artifact they were creating. However, some “transgressions” of the orientations happened, as they engaged in making the best possible sphere. At the individual level, they made efforts on their own creations, as Hector used his tongue to make his sphere “perfect” [OI2 2-54].

The second stage of the clay activity, focused on receiving and exploring spheres from others, also had deviances from the orientations. Opposing to the suggested silent state, the group engaged in monitoring the trajectories of the spheres, identifying the origin of each

received one and sharing the sensed features (like size, shape, and temperature). Additionally, although I had oriented to solely feel the spheres, some felt the received spheres [OI2 2-59]. At the end, in the moment I had destined to sharing, they could describe the sphere of each person. As Caroline reported on the focus group, in this activity they could identify that “*Each one has their own way. Each one has their imperfections, their perfections.*” [FG 14-445]. Renata was stunned by the variety of feelings that could be expressed through a clay sphere [OI2 4-123].

I conducted two meditations (Focus attention strategy) in the intervention, to open the third and fourth meetings. The meditation of the third meeting was planned to relax them and to ground being present in the moment, as well as to make them feel more prepared to act consciously in society. This meditation suggested that they felt as rocks that are exposed to the action of the sea; then, the rigid “rock body” turns into a shell of a turtle, which has the freedom to explore the whole sea. This animal also tends to return to its place of birth to bring new lives. Reflecting later, I see that this metaphor spoke to the observation they made about people neglecting the community and leaving it (discussion presented in the following Section 4.3.2.1). Their relaxation and imagination could be exemplified by the following:

*Juliana – ... We are not in the coast nor in the sea, we are at Mario Quintana neighbourhood. Shall we start our meeting?*

*Hector [pretending he's crying] – Damn!*

*Sabrina – I want to be a turtle!*

*Hector – I was still in Fernando de Noronha [famous beach in Brazil]! [OI3 1-30]*

The meditation applied in the last meeting happened outside and associated the relaxed and grounded state to the observation of the valão.

We developed the mapping activity from the second to the last meeting. At the time when I introduced the activity to them, Hector showed promptitude in sketching the course of the valão on an available piece of paper. Soon they transferred the first sketch to craft paper. Joining two sheets with the available red tape, Hector suggested: “*we could make an artistic intervention. [Keep it] On the front. It will just interrupt the drawing. It's pretty.* Sabrina – *It's the despair line.*” [OI2 20-650]. Sabrina was probably referencing one of the drawings that exhibit an explicit line dividing the different situations and was discussed earlier on Activity 5.

Being difficult to reach consensus or certainty about the location of elements as they remembered, Google Maps was used to support the mapping process. I shared some information about the watershed of which the city is part of and showed them two printed maps of the community provided by the school social assistant, used by her to locate our students' houses.

Although I felt we spent too much time on details regarding streets and exact locations, I also acknowledge the importance of this process to strengthen their connection with the place that is so strongly part of their daily lives. Not all of them live in the close surroundings of the school (as they had discussed in the previous meeting), but going there five or six days per week allows reflection about how intimate they are with the region. The process included discussions on nearby neighbourhoods, stories, names and transformations of places, and the course of the valão. Some of these discussions are further explored in the analysis of the sustainability competencies (Section 4.3.2).

The coloured paper I took in the third meeting was not definitively incorporated to the map they were making but moved following the discussions. Peter tried to stimulate the discussion using it to speak about the elements influencing the valão: “[*Positioning the circles on the map*] I signalised here the spring, let’s say kind of the end, here are the people who... [*change the small pink circles*] I’ll put one here and one there. The people who are part of this water stream [*yellow circles*]...” [OI3 29-936]. At this point, the map was still in a crude stage; Peter was not present at the previous meeting, when the map started to be traced, and thought the red tape represented the water course. A significant amount of details were added in the end of the meeting, and the papers were used again; they point the school, the recycling shed and gardens that they were aware of [OI3 34-1100].

After all these efforts, they argued with me that printing the map from the internet would be a better strategy; although I tried to explain the importance of creating their own representation of the region, they planned how to print the map [OI3 38-1234]. I proposed an agreement that they would customize the printed version, taking it finished to the last meeting. They brought it in the following meeting, but not ready, so we used some time to do it, after exploring it outside. They then used blue to highlight the course of the valão; pink hearts indicating their houses and red places such as food gardens, CESMAR, houses around which sewage is dumped, and the recycling shed.

Figure 4.2 shows the different mapping stages along the meetings.

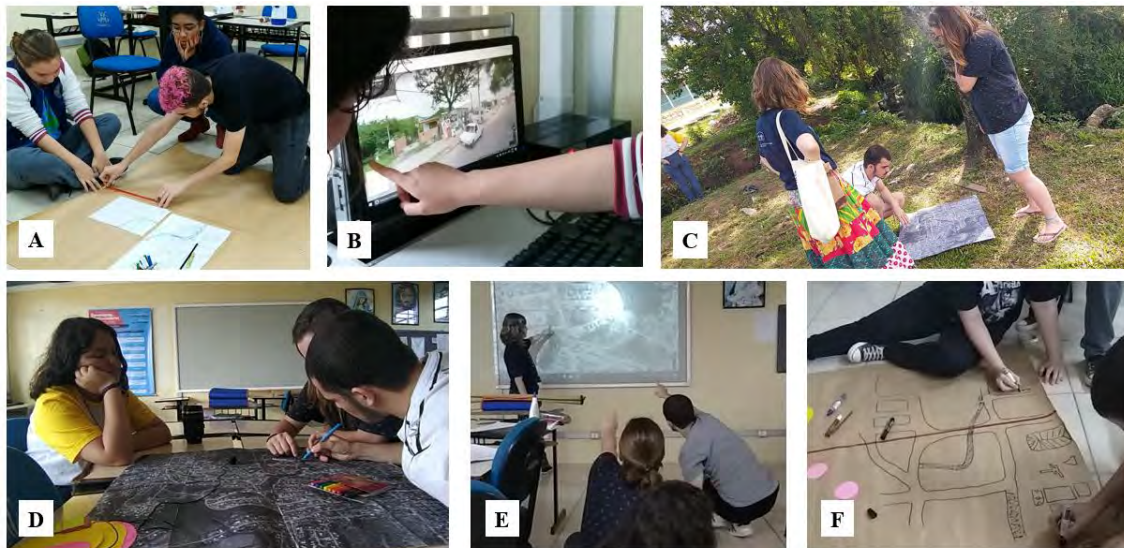


Figure 4. 2: Stages of the mapping process of the valão. In (A), they start to move the sketch to the craft paper in the second meeting. In (B) and (E), exploring the region through Google Maps. In (C), examining the printed map outside. In (D), indicating relevant points on the printed map. In (F), incorporating more details of the surroundings in third meeting.

I left the group relatively free to perform the Collage activity in third meeting, with the intention of moving myself towards the role of observer. I supplied them with a variety of materials, which included magazines besides their drawings from Activity 3. When I set the orientations to the activity, Hector confronted my attempt to define a time frame: “[*indignant*] – *What are you thinking?! Artists require time.*” [OI3 5-157]. The group started by deciding how they would get organised to execute the activity. Hector proposed to split in two groups so more ideas could be generated, but finally they decided to produce one collage together.

The group spent a long time at the beginning looking for ideas and exploring the magazines. They could not make a decision about what to do until we had a discussion about the circumstances involving “taking action”. Hector brought attention that the availability of materials influences the creative process:

*Hector - Look, I think we are kind of trained to be war artists, war cooks, war people. Because look, you gave us a white stuff [piece of paper], material and we are like this. The other time, when we didn't have so much, let's say the other times we had almost nothing, we made it quickly. Because we are trained to make with... I mean, not the rest...*

*Juliana – Without abundance?*

*Hector – Yes. [OI3 7-233]*

When I asked, Hector agreed that a similar situation happened at the portfolio production, when I also supplied the group with lots of material. In both situations, they spent a long time at the beginning planning and thinking on what to do. I argued that they did not need

to use all the available resources, but he tried to explain that the abundance itself would be an obstacle: “*Juliana – Blocks [the process]? Hector – Yeah, feels like it scares us.*” [OI3 8-247].

Giving the instructions to the activity, I expressed a strong suggestion that they used their drawings produced in Activity 3. At first they had some resistance to it, and I although I know by our familiarity that some of them are acquainted with collages, they expressed some scepticism listening to my explanation about the symbolic transformations involved in this process:

*Juliana – The cool thing in collage, as you know better than me, is that we can re-arrange things né.*

*Hector [taking the drawings] – Ok, let’s use this.*

*Juliana – Yes, I would really like that you use your drawings. Because it is something that you put in what you are feeling and this is very important, to reform what you are feeling. ... Because you drew from things you feel, from your reality, and we want to change this reality. So changing through the drawing is a way to start to change this reality. Like that strategy where you write down all that is making you feel bad and then you burn that or rip it... It’s something symbolic that helps us to... I don’t know, unblock things.*

*Caroline – Does it?*

*Amanda – Ok.*

*Caroline – I never did it, but ok.*

*Hector – I don’t have the patience, the time, the money to burn stuff, but... [OI3 8-250]*

From their comments, two situations related to the creative processes can be identified. One of them is led by mental processes of planning (represented by the described above) and the other is taking action spontaneously in “scarcity” situations. The tension between these states is illustrated when Hector expresses some attachment to his drawing after describing part of his creative process:

*Hector – Oh my, when I start to think about something to do, my head turns into a mess. I swear I can see exactly a black screen and all the things that I am thinking about go like this on the black screen [gesturing] all of them, all of them... pa, pa.*

*Peter [giving Hector the drawing] – Cut this doll.*

*Hector – No, the drawing is mine. [OI3 9-287]*

After all, their collage used the head of Hector’s drawing, whose hair they represented as an expanding water course, divided between blue and black. They divided the sheet, using the

left size to symbolize the current state and the right size, the desired state. Hector's poem was positioned left and he wrote a new version of it to the right. Although they kept dividing both sides, the line present in this representation is not solid and apparently external to the water (as present in Drawing IP1-4 from Activity 3), but blurry, composed by the two states of the water itself. When they were deciding how to do it, Sabrina suggested: *"Maybe more like Peter's [drawing], that splits... But there's a junction in the middle, a mixture of both."* [OI3 11-346]. They also used Amanda's drawing to place people in different moods in each side. In Figure 4.3, the group shows the collage.

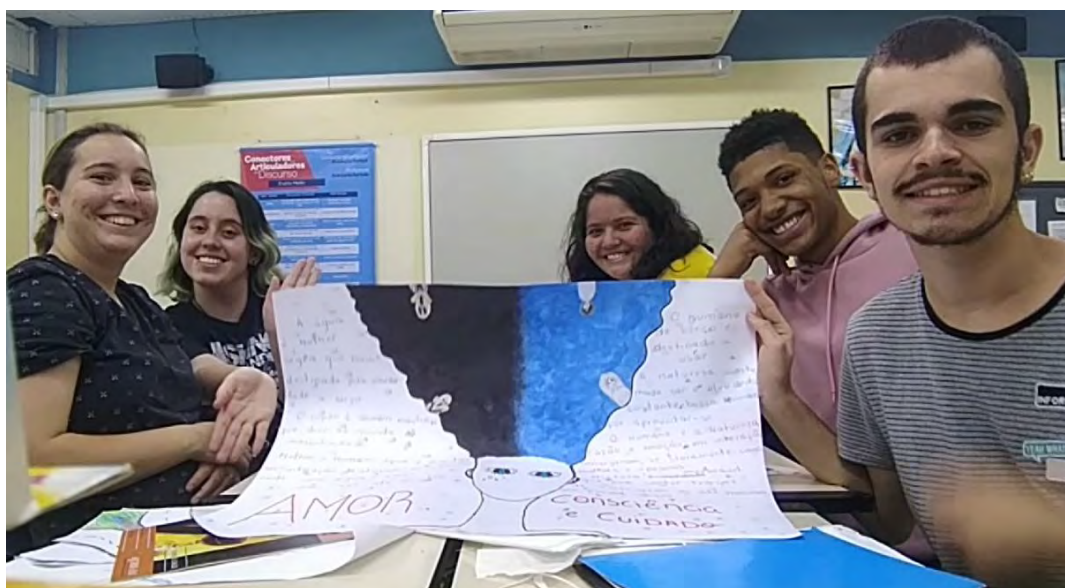


Figure 4. 3: Collage produced in Activity 9.

### 4.3. 2 Analytic phase 2B – Sustainability competencies

This section presents results related to analytic phase 2B, focused on the identification of sustainability competencies observed from the post-project intervention (Cycle 2 of this research). Data is presented according to topics discussed, and then linked with Wiek et al.'s key sustainability competencies (2011) at the end.

#### 4. 3. 2. 1 Values at the community or How humans t(h)reat nature

Data from the discussions could reveal some values the students consider important, being those negative or positive; identified at the community or just aspired.

They long for some kind of cohesion at the community, something that could make people work together to a better place. People, instead, are concerned with how they look to one another. This was explicitly expressed at the very beginning of intervention, after having watched their "Quem somos nós?" documentary:



*Hector - I think this was the first time I paid attention to something else that my grandmother said – that lady is my grandmother – about the unity of community, that her dream is this. I have never paid attention to this! And I think that this is one of the main deficiencies here. Because it seems that the worse we are, the better we want to (compared to the one next to us) be than the other who's next us. I see it in the neighbourhood: people are concerned not about how well the other is, but how better than they I am. (...) One can be bad and I can be bad, but I must be slightly better than them. I think that that is a problem. (...)it also happens at the school. [OI1 2-67]*

and at the focus group, when asked if they felt able to put in practice what was planned:

*Amanda – It's not that it's impossible, but (...)*

*Sabrina – I think I know what's the motivation that is lacking. Community getting interested, the dwellers getting interested, because... we think that we can manage to do it, but there is no point in going there and doing it without actually willing to, because we know that the community won't help after we make that.*

*Amanda – And if we do all that and the community stays the same? And start to spoil it again? [FG 18-597]*

A characteristic from people in the community that probably holds people back from working for improving their environment is that they get conformed to their reality, a kind of voluntary blindness as Renata drew in activity 3 (Drawing IP1-8). At the preliminary discussion about community problems, they pointed: “*Convenience! Because I think that like, it's bad, but why not try to make it get better?*” [OI1 8-259]. This student later exemplifies by speaking about his mother, that at some point embodies these features but also holds some potential to act, even though to his son:

*I am like the 2018 deconstructed youngster that likes plants, loves cacti, separates waste and let's live in peace. (...) But like, I see more and more that the families' dream turns into the youngsters' dream and live for them, you know? Like, my mother doesn't dream about her anymore, now she dreams my dream, you know? She doesn't dream about a better future for her, she dreams a better future for me, no matter where she is, you know? And she's not even so old, she is 33. You know? And she is already the person who stays conveniently at home, who doesn't go out, works all week. And that's sad. [OI1 27-881]*

Some of the other students said they also feel this in their families. When trying to explain the lack of agency, they find lack of self-confidence generated by frustrations:

*Caroline - I think that also they don't do anything because they know that it won't have success, right? Because (...) they already know that it won't work. Like when they planted those flowers in the tires and stuff, at the first time that they planted it went very wrong, because everybody threw garbage, lots of stuff. (...) They have done it at the water stream, put tires and earth and so on, they have cleaned*

*around it, it was quite cool, they have planted something. But then people started to litter again. [OI1 9-270]*

Hector signals that he does not think frustrations are a valid justification for not doing things, indicating that it is important to have persistence:

*Hector - But there it is! It doesn't have success because we don't do things. (...) I will make a nonsense analogy. Anitta [brasilian pop singer] said at one interview that it won't be at the first song that she is going to achieve international success. Nonsense analogy. She had to try one, two, three, four... perhaps in the tenth [attempt]. We don't even try at first, you know? [OI1 9-275]*

As it would be expected, what they see at the community reflects in school, as stated in Hector's first saying.

They expand their perceptions about how people deal with their environment discussing the public places. Conservation of these is an issue that outstands for them; since there are some vacant areas in the region, these are normally loaded with residues. The issue of waste is a central concern and main indicator of people's environmental attitude to the students (cite ch2?). Caroline signals the importance of pleasant areas (which they think are not so present) – meaning clean and with vegetation:

*Caroline – I don't know how to put it in words correctly, but the fact of not having so many plants and a place which we see it's nice. People litter every place that has some more plants. Like at the valão, it has some trees but it's filled with garbage*

*(...)*

*Sabrina – The community doesn't take care of these places that already have vegetation, they litter. [OI1 10-317]*

I asked them if people there had any other alternatives besides littering. They agree that this situation is mostly due to people's attitudes, since waste collection service is available. Hector says this attitude becomes normal when people see others littering:

*Juliana - Why do people litter there?*

*Caroline – Because they are sloppy.*

*Hector – Social constructs (...) The service passed today, by the way. This morning. [OI2 16-529]*

The critiques to people's attitudes continued when CESMAR's waste management came to discussion. They remembered their findings about it from the inquiry conducted when in Horta & Gastronomia (perceptions about the social centre are explored in Section 4.3 ).

This lack of care with the place where they live, which feels alarming to them, can be illustrated by what Hector called "radioactive effect". The discussion was raised from Activity 5,

exploring the words they wrote about the valão. Sabrina explained her perception of despair by a concern about her descendants. That led to some discussion about the future (explored in Section 4.3 ), when Hector relates the effect he observes at the community. He says that people usually don't take care of that place because it hosts an ephemeral ambiance:

*Hector - ...Because I think people's dream is not to change community. It is to leave the community.*

*Renata, Sabrina – Yes.*

*Hector – That's the problem. Like, I don't want to change here, I want to [gesture of leaving].*

*Juliana – To run away.*

*Hector – Exactly. And then what's gonna happen? Somebody else comes, then the person stays here until they get a better life and then leave. And then the cycle is renewed until it gets worse and worse and nobody comes anymore.*

*Renata – That's why the school sends people to Canada [on short internship], hey?*

*Hector – And I call this “radioactivity effect”. It makes people get out of the place and nobody else comes back. And then it turns into tourism. It is quite interesting.*  
[OI1 30-1004]

Given that the group was focused on criticising people's attitudes, I asked if they thought dwellers were responsible for the problems noted on the scheme, to what they declared to recognise a broader influence into their reality. They pointed to have cultural, political and other societal factors determining the situation at that limited region:

*Caroline - it comes even before this, of an educational matter, a politic matter, what is taught in schools, how society is, how the people that we elect do something - [hawks] don't do – to solve problems... It's like if the valão was just a root of a big tree whose top is actually politics, and then there are many things that go...[OI2 18-583]*

#### **4.3.2.2 CESMAR's role**

Centro Social Marista is seen as something differing extremely from the surroundings and the students point the positive impact it has on people there. The school's pedagogical staff is aware of the different behaviour of students when coming to IJB. The students show respect and it is observable that the infrastructure there is preserved, in contrast with other spaces in the community. The discussion about one's positioning according to the place people are at was stimulated by the presentation of the Canadian project De-fence (See Section 4.4.1 for the analysis of activities applied at the intervention) and touched the topic of vandalism, which

appeared recurrently along the meetings. In Brazil we are concerned with security, and the Canadian example gave a new perspective about the topic, which led to thinking about the influence of CESMAR on people:

*Juliana - So much fencing gives us this feeling of being prisoners. They [Canadians] are doing the inverse movement. They offer the service to people who want to take out the fences of their houses and make more beautiful gardens.*

*Peter – So dangerous. (...) in Brazil this is not possible. Imagine if we take out CESMAR's fence and put grass instead.*

*Renata – No more CESMAR.*

*Hector – Actually I'm not sure about CESMAR, because people have an idea...*

*Peter – Do you think? Oh my, but there's always someone...*

*Hector – I think this is also a problem, because we have different ideas of CESMAR and public schools. You know? We respect CESMAR but don't mind about public schools. [OI1 20-671]*

Renata expresses the difference CESMAR represents from the other parts of community and Hector illustrates the contrast:

*Renata -To me CESMAR is a place like... it's heaven, you know? Heaven in hell. (...) look: there is a lake, trees, flowers, plants... This and that... You went out of CESMAR gate and it's all wrong. Then you enter, seems like another reality, it is a very different thing. And I think this invigorates you.*

*Hector – And it is here that my revolt starts. I love CESMAR, I receive so much. I am not complaining of anything about this. But, man, what a hypocrisy, you see? Wow, how beautiful is CESMAR! Wow... [pointing to the street] wow. You know, wow.*

*Renata – Exactly the discussion on beyond the walls I was saying.*

*Hector – Wow, the street is not even paved. Wow, the sewage running in the valão. Wow, gunfires just there, sometimes here. And then... wow, Marxist. [OI1 28-912]*

From these declarations, we can see that the social centre constitutes something that we can face as an “island space”. This concept resonates with Renata's image of “heaven in hell”. A safe and firm place, where things seem to work, in the middle of chaos; a place that restores hope and that in some way inspires people to act differently. And not only the physical features build a remarkable place, but also the people in it:

*Caroline – I think that's because of the very different ways we are treated at CESMAR and at the public school. [Here] We are like “wow, nice”. Then we look to what was at our previous school and are like “oh my... oh my”. [frumping] (...) I had a teacher [in previous school] who was like... once she spoke at class that any teacher saying that enjoys teaching was lying, because teaching was terrible. She was speaking that “I don't mind my work, nobody minds their work and I don't*

*mind if you pass or fail”, you know... It was just like that. Then you are not helping anything, you are just making things worse. You are not allowing people to think “wow, nice school, I’m going to make an effort, I’ll have a nice place”, but “I don’t mind, I’m obligated to be here”. [OI1 21-686]*

A similar experience is described in the next section. The social centre shows its power when people go there, but the students apparently see this influence too restricted to its physical borders. How could the island borders be expanded and the access to it opened? This desire influenced their choice of an outside issue to investigate at the intervention.

*Renata – We don’t produce anything for the outside. Out of here, got it? We learn, we go and take care of the garden. CESMAR garden, but outside CESMAR nothing happens. (...) We have to do something that also includes people who are outside it. [OI1 25-838]*

Despite the “oasis aura” of CESMAR, the group make a range of critiques regarding waste management, events and educational efforts. During the inquiry conducted at the project, the group discovered some flaws in CESMAR’s waste management. When dealing with waste in general was the topic of discussion, Peter reinforced their perception of possible explanations to people’s attitudes, which had a parallel established with actions of the institution:

*Peter – I think that people are so lazy. Like for example: there is a different bag for each kind of garbage, then they start to throw everything in the same...*

*Juliana – Like we saw that happens here [at CESMAR], right?*

*Hector – Ah, by the way I love to throw this at their faces, that CESMAR doesn’t select its waste. Like yesterday at class. I love it a lot. [OI1 19-612]*

They also criticised some aspects of the regular events for the community that happen at CESMAR. They wish the events held there responded to the lack of unity and inaction they identified at the community (See Section 4.3. “Values”). They say that more events could be implemented if expenses were better managed– to illustrate, they point to “irrelevant changes” executed there and daily management of the space [OI1 7-204]. They also question the lack of active involvement of the community members in the events, something that can exacerbate the current state of inaction among people:

*Hector – “Cultural CESMAR”, isn’t it? Ok, great, but the community sits and watches.*

*Peter - But it’s always the same. Always a play and that’s it. Theatre and a candy.*

*Hector - I also think that there is a lack of events where everybody can participate on the execution. (...) But look: it happens at our home [CESMAR]. And we don’t even get to know what it is. [OI1 7-218]*

From this they presented some ideas that could address this question, like different events for the community (See 4. - Building) which people could arrange together.

#### **4. 3. 2. 3 How is it called? – the influence of word use**

When the group decided to approach the valão as the topic of investigation in the first meeting, Hector shared an experience he had that resembles one of the “island space” kind, described in the previous section. Although their drawings from Activity 3 had brought mainly “negative” impressions, he told how he could find peace there. They were executing a Nature Sciences school assignment which asked to represent by photography the water on the community. I remember that they presented a touching work joining photograph and poetry in this task. He explains what happened when they went there:

*Hector – I was seated there. We went to take the pictures, they [the group] were at the other side of the valão to take the picture. (...) And then they were chatting and I was still, just existing, just breathing. I was listening... Guys, all right, it's the valão, but for me that is incredible. I was like... guys, I am so... [soft voice]*

*Peter – It has been clean someday.*

*Juliana – Why?*

*Hector – Not even because of being clean. It's because there is a calm place, it has nature, you see?*

*Peter – But there is the valão.*

*Hector - But there is the valão.[OI1 29-961]*

These “island space” experiences, along with some stories and part of the popular imaginary, indicate the potential held by that water stream. Despite the predominant heavy perceptions (also revealed in Activity 3), the strong sensory stimuli such as smell and the dominant presence of trash in a neglected space, it can grant experiences of hope, peace and encounter with oneself.

During the project activities, when addressing waste topic, we established a discussion about the words used on it. In Portuguese we commonly use the word “lixo” (garbage, rubbish) for anything that is discarded. This word has a derogatory meaning that gives the idea of something that has no value or that is disgusting. This logic probably holds people from approaching the problem: people ignore what happens to the material after they put it out, but, as it was mentioned in one of the meetings, “there is no out” [OI2 14-448]. The quote was used after an image Caroline sent on the WhatsApp group aiming to bring attention to the issue of waste. Instead of using the word “lixo”, we adopted “residue”, as a symbol of a start to looking

at the question. The process of resignification of questions includes leaving “wicked words” behind and adopting others that allow recognition of the potential of a water stream or materials (the transformation of waste in artworks is showed in “Lixo Extraordinário”, one of the videos exhibited in Activity 1).

*Hector – It’s a beginning for a change.*

*Sabrina – It’s going to make people see it in another way and caring about it in another way.*

*Renata – Exactly. We stopped calling garbage “garbage” and started calling it “waste”.*

*Sabrina – And we started caring about waste in another way.*

*Renata – Ah, see. It’s a different way of seeing it. [OI2 13-403]*

At certain point, the group applied the same logic and questioned the use of the word “valão”. After some search, we decided to use another word:

*Juliana – What aspect of the valão...*

*Renata – We already deconstructed that it is a valão.*

*Sabrina – We are not going to call it valão anymore! Let’s find a name for it.*

*Hector, Caroline – Water stream.*

*Juliana – I’ll open that document at home and send you what’s written there, but look: valão is a water stream where sewage is thrown.*

*Sabrina – Ok, so it’s our water stream! No more valão. [OI 33-1079]*

#### **4.3.2.4 What makes the context around the stream?**

I somewhat struggled to directly identify different influences on the valão. When I asked the students to identify “people or places that impact the valão” when mapping (Activity described in Section 4.3.1), I received “the community” as a broad response [OI3 19-621]. During the meetings, the group could gradually identify different actors, actions and places that interact (more or less directly) with the water stream. The context around it can be faced as the objective one (physical environment, influences) and the subjective one (imaginary, stories, perceptions). Some of the characters identified were dwellers (elder ones), and gardeners. Some of the people addressed on the discussions take the role of communication, by giving information or telling stories; others are located in the role of action, by polluting the water (sewage or waste) or by gardening near.

Quite some time was destined to explicit what path the water stream traces. The reference points they used to locate themselves and discuss the valão along its path were kindergartens (a marist one, closer to CESMAR; and a public one), parks, the garden, CTG's, a recycling shed and classmates' houses.

After the first meeting, Renata told us they went investigating, talked to some people about it and followed valão's path, but could not find where it starts; though they had a guess. Their search was hindered by a potentially dangerous wet area covered with dense vegetation [OI2 5-135]. It is well-known that the valão goes until Feijó brook, a water course that joins our Gravataí watershed, but its headspring was kept surrounded by great mystery to us. It also divides perceptions about it: the students imagine that it could be the worst part (in terms of pollution), but also brought an image of a beautiful headspring with clean water that integrates some sayings at the community [OI1 30-989]. They decided to follow its path via Google Maps. It was not possible to follow its whole extension because the software only shows "official" streets, but at certain point they got to deduce a possible location. Renata told the story to explain the place:

*I think I know where this spring is. This water goes until my family's football field, because they talk a lot about going there, and there is a stream where my dad told me they used to swim and the water was very clean sometime. It came out right from the spring, there was even a waterfall. There it is. I found it! [OI2 27-864]*

As before this meeting they went investigating the course of the valão to find its headspring, they then planned to go to that place to ascertain the location. The imaginary related to the valão includes other stories about the past, when it supposedly was clean and dwellers had a more intimate relation with it:

*Peter – My grandma said it was clean once!*

*Caroline – Yes, my grandma tells me stories of washing clothes in this...*

*Peter – Yes, mine as well!*

*Juliana – Where exactly?*

*Peter – Your grandma lives here more time than mine, right?*

*Caroline – There. Yes, my grandma lives here since I don't know when... since she got married, I guess.*

*Sabrina – Since she was born! [OI3 28-900]*

Overall, the relevance or positive meanings to the valão were not directly identified by them. It was difficult to explicitly identify at that point the roles that the valão could have. When questioned about it, they answered that it was being used as a garbage and sewage receiver [OI2 10-323]. Sabrina at first declared that she could not find any relations between her and the valão



[OI1 34-11431], but later associated it to floods her mother suffered at the neighbouring town [OI2 29-938].

Regarding influences on the valão, one central question at the beginning was sewage. Some doubt was raised whether the valão receives it or not [OI2 11-334]. This was also relevant when approaching its nomenclature. They also planned to verify this aspect when visiting the valão once more [OI2 33-1088].

Possible influences of the valão on the local biodiversity were also considered. Renata pointed out that a blackberry tree on its margins produces fruits that “aren’t good” [OI2 11-356], that do not look like normal blackberries. Caroline says it is not possible there are living fishes in that water (when they were searching images on magazines during the Collage activity; OI3 6-189). Besides, the influence on the quality of crops was also discussed (See in next section).

#### **4.3.2.5 The food garden by the valão**

There are some food gardens in the community identified by them. One of them is the garden that was visited by the group while participating in the Horta & Gastronomia project: Hector at some point asked about it. Some small gardens near the water stream were brought up and I asked about another one which I saw once, to what Peter explained that it is an individual effort [OI1 16-537].

The topic of food gardens was brought into discussion when discussion went to food production at the community. The students mentioned that, being a poor community, people there rely on low quality food – which they associated with the ones from modes of production which use pesticides [OI1 15-475]. This reminded them of that food garden that “someone” established at the valão’s borders, close to the school:

*Caroline – ...here, since we are, like, a very poor community, no one has money to buy...*

*Peter – Conditions..*

*Caroline – Yes, conditions to buy better stuff, then we buy stuff that are (...) Yes. Pesticides.*

*Hector – I think it’s [a matter of] difficult access, maybe.*

*Caroline – Yes, access. Because, they even made that thing [the garden] next to a “valão” [laughs]. [OI 15-475]*

Among the other gardens identified in the mapping process, this one attracted considerable attention due to its size and location, the variety of plants present on it and its potential to address

the question of access to food. They affirm that it is a community garden [OI1 16-522], and we remember the topics of agricultural systems approached in *Horta & Gastronomia*:

*Juliana - It's like a super garden, it has many things and it is next to a valão.*

*Caroline – Exactly.*

*Peter – Yes, there is a lot of things there, indeed.*

*Hector – Isn't it bad?*

*Juliana – It is.*

*Peter – It is. But it doesn't use pesticides.*

*(...)*

*Caroline – Just the ones on the [valão's] water.*

*Juliana – How is it [the garden]? Tell us.*

*Peter – I don't know well, but I saw that it doesn't use pesticides, but it is next to a valão, then... Doesn't harm but it harms, see?*

*Caroline – It's kinda nasty.*

*Hector – But maybe it harms less.*

*Peter – Yes.*

*Caroline – Yes, I think it harms less.*

*Hector – No, maybe. Because it has all the waste from folks.*

*Juliana – Yes, what would be the problem, guys? Look: we have treating with pesticides or growing next to a valão?*

*Caroline [laughs] – I think neither of them! [OI1 15-490]*

They raised a hypothesis that maybe the vegetables grown at this garden are sold at the market in front of it, which belongs to the man who started the garden [OI1 16-528].

After agreeing that the food garden is not located in a secure place, they wondered what better place for it they have access to. Suggesting a further open field, they faced a conflict, since it supposedly would take place of the area used for football [OI1 18-563]. Here they show their awareness about the importance of common spaces of leisure at the community.

They place the garden as the only positive influence acting on the valão; they face it as an effort of cultivation in the middle of that “negative” environment: “*Renata – Poor him né, he is so glad that he thinks that he is saving the world.*” [OI1 31-1018]. They see that this effort inspires people to take care of the place:

*Caroline – I think the garden would be the only place that... has some kind of positive influence, because it's like the only place that, let's say, kind of cleans the...*

*Amanda – Takes some care.*

*Caroline – No, because there's loads of plants there, you know? There's a lot there, and like people take out the garbage around it ...?? the plants.*

*Juliana – Ok, and what's the influence plants can have on the valão, on the waterstream?*

*Caroline – They help to... purify more.*

*Hector – To filter.*

*Caroline – Yes, like purifying.*

*Juliana – Humm. And this has something to do with what we were discussing about the pesticides and the valão, right? Which is more... interesting. If plants filter things... [OI3 19-630]*

#### **4.3.2.6 Group values**

The analysis of drawings in Activity 5 revealed dualisms in their perceptions about the environment, which could be expressed by: city/human – ugly – dirt; nature – beautiful – clean [OI2 7-214]. These were also expressed on the poems used in the Collage (explained in Section 4.3.1). The poems play with woman and man, reason and emotion, human and nature, perfection and imperfection. In Activity 5, Hector's poem was discussed. It uses gender and racial themes as metaphors. Clean water and sewage are placed in opposite sides, as well as woman and man, water and oil. Caroline expresses some resistance to this movement, apparently attributing equal environmental impact to all humans:

*It's kind of complicated. But... I don't know, I think that even this thing of water being compared with human being already bugs you because it is us that do this to water. We pollute and do all these things. I don't know, I think that you could just compare man with sewage if it was man like human being, not like man and woman. I got the comparison, it is (?) quite nice, but I mean... I think that everyone, no matter gender, sex, I don't know, ethnicity. Like everybody ends up just helping to pollute more and more, so decrease the birth rate, don't have children! [pointing to the camera] [OI2 8-228]*

Following the explorations of oppositions, the group discussed their impressions about the topics and made associations: which would be emotion and which would be reason, between

humans and nature? After all, they agreed that humans resemble reason while nature is associated with emotion:

*Caroline – Hum... for me would be emotion for nature and reason to human being.*

*(...)*

*Amanda – I think both, cause you see... like, human can also be emotion because he acts a lot and doesn't think about his acts.*

*Hector – Darling, we are at ENEM [National Exam], we have six hours, there's no option like this, it's a, b, c, d or e.*

*Juliana [to He] – Did you listen to her explanation?*

*Hector – I did, but this alternative doesn't fit my poem.*

*Caroline – Ok, let me see why. I think it's because... nature doesn't have so much... like, it doesn't have this necessity of explaining, making a whole thing, it already acts naturally the way it should be you see? So it would be something that you just feel and stand there quietly and you kind of are the nature together. And the human would be more like I'll explain, I'll make things, I'll modify DNA, I'll do this and that...*

*(...)*

*Caroline – Yes. Let's make shit, pesticides, generic.*

*Peter – Let's kill.*

*Caroline – Let's kill, let's...*

*Amanda – Let's elect Bolsonaro [then a candidate in Brazilian elections]*

*Caroline – Let's elect Bolsonaro, let's kill forests... [OI3 12-395]*

From this understanding of nature as a flowing entity and humans turning things complicated, I tried to stimulate thinking on positive human actions. It took some time until they could mention any, and the first answer was Sabrina's "To die. To become compost." [OI3 15-493]. Caroline affirmed that the world would not have "problems" if humans did not exist:

*If you imagine the world, like, the planet being ok, without any humans, without ... without anything, it would be all so nice. It would be a circle, exactly, without any problems!*

*Juliana – But it would be completely different. Imagine this: we had years and years and years and years of evolution along with all the rest of the living beings that are with us. Do think it was always like this? Like destruction?*

*Caroline – Maybe when we didn't think. But then we started creating things that weren't good to the environment. [OI316-510]*

Addressing normative competence on the investigation of a sustainability programme, Remington-Doucette and Musgrove (2015) make considerations about the influence of age on it. They use studies on human development to signal that young adults often still adopt simplistic, dualistic understanding of reality, a stage that gradually changes to the acceptance of complexity in reality. This is an important insight to reflect on the approaches that the students expressed in the present research.

In Activity 6, the time dimension was approached when Sabrina expressed some feeling of despair and explained it with her concern about the worsening of the situation to her descendants. She assumes that if the situation is bad at this point, it only tends to get worse. This inspires different reflections among them. Sabrina thinks about changing the situation motivated by the next generations, while Amanda states that the ones that will change is the next generation:

*Sabrina - If it's like this now, imagine when I have children or grandchildren or I don't know, greatgrandchildren.*

*Juliana – How it's going to be?*

*Hector – What is the first thought? When you think about when I have my children and grandchildren, what is the first thought?*

*Sabrina – Changing, for them.*

*Amanda – They are going to change.*

*Hector – To another place, they are not going to be here anymore.*

*Renata – Yeah, that's me.*

*Hector [to Sabrina] – Not your first thought, but common sense first thought: "Imagine when I have children. Ah, I won't even be here". [OI2 15-472]*

#### **4.3.2.7 Building something**

Signs of discouragement of the students appeared repeatedly (as observed from their perceptions about the influence of humanity explored in the previous section). In second meeting, when we were developing the exploration of the influencing factors, the feeling showed as an apparently easy “solution” to the problem of the valão:

*Hector – I think it would be interesting, I was saying to Re, if the city hall channelled it and put earth on top of it and that's it.*

*Renata – Ah, it's difficult to channel it.*

*Juliana – Why?*

*Hector – Because... not to hide the problem, but to diminish it, because... how long it will take if... look, if people try to solve it, how long it will take? [OI2 10-314]*

This process of recognising that it is a problem that demands medium to long-term solutions seems to demotivate them. Changing people's minds and mobilising them to act feels an endeavour that demands too much energy and time:

*Juliana - before you said ah, if the human being didn't exist it would be alright. But we need to think in a solution considering the existence of human beings! That's not the solution we want to give to the valão, the waterstream here, is it?*

*Sabrina – That's an idea...*

*Caroline – It's that people already come with this of building things to make things easier.*

*Juliana – Yes. Easiness, comfort.*

*Caroline – Yes, with technology and this and that. So it gets kind of hard to suddenly make people aware that it's not ok doing this. It's so that we have lots of campaigns addressing this and no impact on people.*

*Juliana – It's interesting what you said about people "suddenly" get aware. How can we make them aware in another way that is not sudden, since suddenly is tough?*

*Caroline – I don't know, because it's being many years of work and nobody cares.*

*Juliana – Do you think nothing changed, nothing got better?*

*Caroline – It seems to have got worse, unfortunately. Although... the number of people trying to fix it improved, but at the same time the number of people trying to destroy has increased.*

*Sabrina – They naturally destroy, they don't even need to try it.*

*Caroline – Yeah, then it gets kind of uneven, you know? Then it doesn't go right. [OI3 17-534]*

Even with these perceptions, education was one of the first topics to appear in the discussion about problems at the community and is revealed as an important topic to them (as exposed in Section 4.3.2.2). Renata believes that education would be the most effective investment to address the problems identified at the brainstorm. She states people would need to see the relations between topics as the group envisioned so everyone could work in the better

possible way to find solutions. With this, she expresses that only trying to shape people's behaviour would not be enough:

*Renata - What if we had a workshop open to community, something like that. Because listen, it doesn't work if we put pressure on people, we would need to educate them. And if they learned by free will, they would be able to better see these topics we put there and maybe we had a better feedback, to change this through education, because everything is consequence. [OI1 25-826]*

She reflects about possible and desirable educational strategies to enhance community wellbeing. Trying to address their feeling that educational efforts are restricted to the social centre, she recalls the slogan adopted for CESMAR's 20<sup>th</sup> anniversary: "CESMAR beyond the walls".

They recognise the role the Project Horta & Gastronomía had in their formation regarding reflection about community issues, expressing that such kind of activity could be offered to the community [FG 18-609], although improved. Renata says that a logical strategy should go beyond capacitating people at the social centre and starts a discussion about learning strategies:

*Renata – We bring them and then we go. Go with them outside. First we build a group here, then we give them all this idea and from this we go beyond the walls. (...)*

*Juliana – So we would have to, more than open to people, create something new.*

*Renata – I just don't know what. I just think that it must be something innovative. I think a lot on innovation, because that thing of entering and watching, ok, it's very important, but this is something that discourages, people want to do, they want to make something hands-on, but it's difficult until they understand that.[OI1 26-856]*

Then the relation between theory and practice turns the topic of discussion. Renata declares that education can take diverse forms, and not only be restricted to classrooms, although it seems educational efforts in general require energy to be accepted. She uses the example of the gymkhana they organised while part of the student union. She says passive strategies discourage (as shown in the excerpt above) but also that the willingness to act is not common – in accordance with the stated convenience.

Their willing to put ideas in practice was expressed some times, especially when sharing them. At the first meeting, when I was explaining the activities, they inquired if the community would benefit by it or if it would stay restricted to the room where we met [OI1 28-934]. In the last meeting, Sabrina demanded my participation with them until the process was completed (in this case, this meant taking action – beyond the scope of this research), and Hector expressed his concern regarding the possibility:

*Hector - Nothing, I'm thinking... You fill us up with things, you create a whole dream and now say like [throws kisses and nod]*

*Sabrina - "Bye!" [OI4 11-366]*

This question was object of reflection about my personal process, since my tendency in general is to stay in the “theoretical” at the expense of acting. This happening also involved dealing with the ethical aspect of the research. In this case, I wanted to show them my willingness to follow up with the endeavour, but my response (in the following excerpt) made me question my performance as an educator that enables changes. I stay with the question on whether I should show more initiative in giving suggestions and determining what could be done, instead of giving them space to do it:

*Juliana –[From] Now you're going to schedule things.*

*Sabrina - You committed yourself!*

*Juliana - You can schedule the next thing. I really did commit. [OI4 11-373]*

A way to escape the inertia approached by Renata resonates with the effect CESMAR has on people that go there. The group reminded the different places they visited while at the project and acknowledged the influence of it in changing mindsets and stimulating willingness.

*Renata - When we were here in the Horta and then when we went to that [Santantonio] grange... It made a huge difference. Because we end up living what we are learning.*

*Hector – And not even so far. [Comparing] When we were here in the classroom and when we were at the garden.*

*Renata – Because we are not used to this and we go to such a beautiful place like the Botanical Garden. Wow, it looks like another world, how come? We come back full of dreams and will. [OI1 28-899]*

She believes that the problem with basic sanitation would be mostly solved if people were educated. She speaks about waste selection in this topic, saying that education would make people care about the theme and then change their habits about it, a similar positioning to the conception of linear causality in EE described in 2.1. Here it is relevant to question what concept of basic sanitation is being used.

*Renata - The question of basic sanitation that we saw on the book. Having an education you would take care of that, because you got educated, you have learned and then you would take care of that. The question of selecting waste, rubbish. It comes from education. I think that everything comes from...*

*Juliana - Ok, thinking about basic sanitation: is enough to take care of that?*



*Renata - Most of it, look at the difference that would be. It wouldn't have so much stuff, it wouldn't be so polluted if people cared, if we had a primary education.*

[OI1 5-162]

#### **4. 4 Key sustainability competencies observed at the Post-Project Intervention and their relation with the applied eco-art activities**

Systems-thinking competence could be observed in the mobilisation of information in the investigation about the valão, a process that brought varied perspectives about it. The students explored their own and others' knowledge about the valão, encompassing topics related to their connection with the water course; values; stories; perspectives; physical course and context; influences on and from it.

At first, the connections of that water course were not so clear, but the intervention sequence took the group through physical and imaginary places. I perceived that asking them direct questions was less effective to access their knowledge. Rather, the activities applied contributed to gradually expose it.

Still considering expression of systems-thinking competence, the group approached the possibility of different levels of pollution among valão's path. Naturally, the most easily identified kind of pollution is that which touches the senses. Solid waste is frequently observed in the valão, which is seen as a "dumping ground" [OI2 14-461], a perception that also bothers them when happening in public areas in the community. The often disturbing smell is another striking stimulus of the place. The question of sewage input was brought afterwards, being its existence even questioned. Considering this, it was relevant to get to the valão (during the last meeting) in order to experience and testify the sewage inputs, including, presumably, from CESMAR.

Areas with vegetation were identified as positive influences to the environment, associated with cleaning and also with wellbeing. They could link local food production with dwellers' acquisitive power and kinds of quality food related with its mode of production. Regarding the food garden explored in the discussions (in Section 4.3.2.5), they raised questions about work and resources management and the destination of food. In this topic, they could also use learnings about cultivation acquired during the project, transiting in different scales (local practices and wider agriculture systems) of food production. They also associated the environmental, social and economic domains related to the topic. From the will to identify alternatives of more appropriate places to establish a food garden, for example, they considered other community needs, such as leisure (indicator also of normative competence).

The group got into broader scales by searching the origins of the problem. They recognised cultural, political and educational trends that support the existence of the discussed problems.

Regarding normative competence, the students could map values at the community and seek explanations for it (Section 4.3.2.1), therefore also showing consideration for social systems at systems-thinking competence. The analysis could also identify their own values (as discussed in Section 4.3.2.6) guiding the shared ideas.

From this description, we can observe that systems-thinking competence and normative competence overlap when it comes to values. Similarly to interpersonal competence, we could see normative competence also involved with recognising others' values as well as the participants' own values directed at sustainability. Results indicate a strong pessimism among the students, identified from Caroline's strong impression about the responsibility of humans on the environmental problems and the inefficiency of strategies engaged in improving this situation (as discussed in Section 4.3.2.6). This belief in the destructive power of humans is also represented in Peter's drawing from Activity 3, which depicts a sudden transformation of clean into polluted water marked by a line representing "where humans touch" (IP1-4). In Activity 9, when Hector asked the group about some human action on nature, they were almost unanimous in pointing destruction.

Anticipatory competence included gathering information about the past (See Section 4.3.2.4) from the elder, people who inhabit the place longer than them. More than exploration on the origins, however, the students shared ideas for future scenarios. These ideas were useful also to identify some of important values to them, making explicit the relation with normative competence.

The non-cognitive components of a competence are explored by Barth and colleagues (2007), indicating its relation with the interiorization of values. The interiorization processes involved in competence acquisition demand active involvement of the learner in self-investigation and are directly associated with the affective component present in the learning process (p. 419). Applying these ideas to the activities implemented in my practice, the activities of the Focus attention kind played an important part in enabling this disposition. This learner-centred orientation also resonates with the "visualizing experiences" approaches brought by Irwin and Chalmers (2007). In Horta & Gastronomía, strategies that adopt the "experience the visual" approach were the video exhibitions and the use of pictures to sensitize to and introduce the topic of waste. In the post-project intervention, the activities that explored this approach were the presentation of examples (Activity 1) and the analysis of drawings (Activity 5).

The exploration of the physical place could influence the exploration of their own “internal places” (as presented by Nitecki and Chung (2016); see Section 2.3). Drawing on place-based education, the authors link the development of bonds with special places to the building of self-identity. This process was approached by the activities applied in Cycle 1 and Cycle 2. On an individual level, Focus attention activities and specifically the Drawing of special place (See Section 4. 2) explored contemplation of places, enabling connection with it. The grounding activities stimulated attention to the present experiences, while the Drawing of special place invoked connection with places visited in the past. On the other hand, the intervention process as a whole, focused on their environment where the valão is located, can be interpreted as a collective endeavour in this sense.

As discussed in Section 2.5, interpersonal competence can be faced either as the knowledge about it and as the internalization and practice of it. The importance of the collective feature was observed especially on the writing activities, which they observed to be easier to perform in group. The openness to the unexpected, a feature that contributes to creation of new scenarios in anticipatory competence, also stimulates the epistemological pluralism included in interpersonal competence (as advocated by Wiek et al., 2011). Activities that could have worked in this sense are the ones that deal with different perspectives. In *Horta & Gastronomia*, the visits were determinant to show realities different from theirs (See Renata’s declaration about beautiful places in Section 4.3.2.7). The contemplative posture associated with “experience the visual” activities (either video exhibitions and pictures used in the project and showing examples in the intervention) could also have helped to acknowledge possibilities.

This research process generates a possible recommendation to planning of learning sequences. It is important to include the grounding, Focus attention activities so the participants can enter in an appropriate disposition to learning. The experience with clay represented explicitly some struggle to establish this serene state explained by Miranda (2017) of non-judgemental, relaxed thinking illustrated by the concept of “active absence” (Kaplan, 2002). As discussed previously, this state is crucial to explore the transformation of “potential” into “surprising” in building a desired future. Planning should also include, besides these opportunities of exploration of oneself, direct experiences to establish contact with the different. Thus, the activities can explore new places, new ways of experiencing reality (by exploring different sensory perceptions, for example) and exploring different scales and expressions of a single phenomenon.

A potential to expand this research lies in investigating basic competencies. Dealing with basic education level requires considering the prior steps that support the establishment of competencies directed to sustainability.

While conducting this study and deepening my relation with the students, I faced the importance of self-reflection as an educator. Recognising personal tendencies can help to structure the learning sequences if associated with observation of students' features. I observed their impulse to act, an urge to put ideas in practice, while I use to employ more effort in planning (as presented in Section 4.3.2.7). Thus, I believe that tuning with the group and associating the different impulses holds potential to better conduct the process. My intention is to propose new meetings so we can apply what was prepared in the intervention.

#### **4.5 Conclusion**

The results related to the activities applied in Horta & Gastronomía show the prevalence of activities “about” the environment. Some influences of the adopted strategies (external factors) on the “internal dispositions” are considered. Interrelations between the competencies and eco-art strategies are explored. Reflections on my action as an educator stress the importance of considering the interaction between action and reflection. The study presented directions to the development of teaching strategies for enabling key competencies in sustainability.

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## APPENDIX A – EVALUATION SHEET USED DURING THE PROJECT



Projeto Horta & Gastronomia

Buscar referir a aspectos como colaboração, reflexão crítica, aspectos cotidianos mencionados, habilidades culinárias, área artística, proposições

Data	Assunto
Presentes:	
Número de estudantes	
Atividades	
Deu certo	Dá para melhorar
Interação do grupo	

## **APPENDIX B – LETTER TO THE INSTITUTION**

Porto Alegre, 15 de março de 2018.

Solicitação de permissão para condução de pesquisa no Colégio Marista Irmão Jaime Biazus

À direção e coordenação pedagógica do Colégio

Eu, Juliana Schmidt da Silva, sou atualmente estudante de mestrado na Rhodes University na cidade de Grahamstown, África do Sul. A pesquisa que pretendo conduzir para minha dissertação de Mestrado em Educação Ambiental requer o uso de materiais produzidos pelos estudantes do projeto Horta & Gastronomia na edição do ano de 2017 para análise. Envolve, também, desenvolver atividades em aproximadamente quatro encontros no início de 2018, após o encerramento das atividades do projeto com o grupo da referida edição. As atividades de 2018 consistem em encontros de planejamento e um grupo focal. A coleta de dados envolve análise dos materiais desenvolvidos e coleta de áudio e/ou vídeo das atividades, além de fotografias. A pesquisa será conduzida sob supervisão da professora Dra. Ingrid J. Schudel.

Através desta carta busco consentimento formal para considerar os estudantes do projeto Horta & Gastronomia edição 2017 como participantes da pesquisa e para contatar seus responsáveis a fim de obter sua permissão para tal, bem como para utilizar os materiais produzidos na pesquisa. Requisito também consentimento da co-executora do projeto Vanessa Zago Amaro.

Assim, solicito permissão para realizar minha pesquisa no Colégio Marista Irmão Jaime Biazus conforme descrito em meu projeto de mestrado. Em anexo está uma cópia deste, com cópias dos formulários de consentimento a serem usados no processo. Em anexo também está a aprovação do comitê de ética da Universidade. O nome de todos os participantes será substituído por pseudônimos e todo o material que eu coletar estará acessível apenas a mim e a minha orientadora. O nome da instituição será revelado na pesquisa, conforme já acordado com a direção.

Na ocasião da conclusão da pesquisa, eu me comprometo a comunicar os resultados da pesquisa à instituição e aos estudantes, bem como a outros integrantes interessados da comunidade.

Na necessidade de esclarecimento de outras questões, estou disponível em meu horário de trabalho no Colégio ou através do telefone 999760969 e do e-mail [juliana.schmidt@maristas.org.br](mailto:juliana.schmidt@maristas.org.br)

Grata pela atenção

Juliana Schmidt da Silva

17D7852

Rhodes University

## APPENDIX C – LETTER OF INVITATION TO PROJECT PARTICIPANTS

Porto Alegre, 13 de agosto de 2018.

Quando ainda estávamos com o grupo participando do Projeto Horta & Gastronomia em 2017, convidei vocês a participarem da minha pesquisa de mestrado na área de Educação Ambiental. Um dos objetivos dessa pesquisa é entender melhor nossa experiência juntos, valorizá-la e buscar aprendizados para melhorar este projeto do Colégio Marista Irmão Jaime Biazus, conforme conversamos em reunião de esclarecimentos (aconteceu durante um recreio, se tu não estavas ainda precisamos ter essa conversa!). Vamos relembrar do que precisamos para que tu participes da pesquisa:

- Receber uma carta de convite para participar da pesquisa;
- Autorização dos pais ou responsáveis, se menor de idade;
- Assinar formulário de consentimento para participar da pesquisa (será entregue no nosso primeiro encontro).

Agora é a hora de nos re-unirmos e transformar nossos aprendizados em uma nova etapa. Conversando com o grupo, percebi que os **sábados à tarde** se ajustam aos horários de todos. Quero te convidar para os nossos encontros, que terão início às 14h30min, no CESMAR, com duração aproximada de 3h. Nossos dois primeiros encontros acontecerão nos dias 18 de agosto e 25 de agosto. Os três encontros seguintes ainda terão as datas confirmadas, mas acontecerão entre final de setembro e outubro.

Podemos combinar algum lanchinho! Traz a tua caneca para não usarmos copos plásticos!

Por favor, espero uma resposta quanto à tua participação. Pode ser direto comigo, por telefone (51999760969) ou email ([juliana.schmidt@maristas.org.br](mailto:juliana.schmidt@maristas.org.br)).

Muito obrigada pela colaboração. Lembrando que estou sempre disponível para esclarecer dúvidas.

## APPENDIX D – LIST OF RESOURCES USED

1. “Muito Além do Peso” documentary, from Estela Renner:  
<https://www.youtube.com/watch?v=8UGe5GiHCT4&t=1s>
2. “Story of Stuff” documentary, from The Story of Stuff Project:  
<https://www.youtube.com/watch?v=9GorqroigqM>
3. “#365, Unpacked” photograph series, by Antoine Repesse.
4. “Quem somos nós” documentary: <https://www.youtube.com/watch?v=gVHLPKRcikM>
5. “Remanescer” documentary:  
<https://www.youtube.com/watch?v=WbM84jICz8Y&feature=youtu.be>
6. “Micromundo II” short film:
7. “Mormaço”, poetry book from Elizeu Braga



## APPENDIX E – ANALYTIC MEMOS

### Analytic memo 1

Theme	Aim	Strategy	EcoArt Skills	Expected S Comp	Rationale	Data
Essential needs	about	Body building using different materials	Drawing, sculpting, shape, texture	Systems-thinking, normative	Perceive food transformations and be aware of functions in the different parts of digestive system; have notions of the significance of digestion; be more conscious with body processes. Used as DE	"One of them evaluated the activity in a positive way because of the freedom of expressing the knowledge and identifying errors and accomplishments and other liked the introductory physical activity" [PJ07]
		Body building using different materials				"AI – We had that class with the Physical Education teacher about body. ? – True! Ca – Ah, that we made that great... Am – Ca, the body [to Sa] The body activity. Sa – Oh, true! Guys, there was the body and that huge intestine line." [PP1 11-347]
		Body building using different materials				They remember that the group built some wrong stuff: Ca [laughing] – How is human body according to people who doesn't have access to Google! [FG 2-46] Sa draws – This is a sheet with a little body. Our wrong sheet. If I put the heart in the belly it will be right. Ca – No, it wasn't this. It needs to lack organs. From this, we started to remember the situation and discuss the relations between different parts of the body [FG 5-148]
		Body building				Ju - The matter of the layouts, of painting, moving, of.... we used clay here that time... Does that make any difference? Ca – I think the layouts do. When we made the layout of the path that the food goes down... I think it [the learning] happened. [FG 14-441]
Essential needs, production, environmental sustainability	for	Composter making to take home		Strategic, systems-thinking	Taking home habits to manage part of waste, practical knowledge of composting, knowing the importance of compost. DE	not enough materials at first attempt [ES04]

### Analytic memo 2

Aim	Strategy	EcoArt Skills	Expected S Comp	Rationale	Data
about/for	Sheet/scheme to represent community problems		Systems-thinking	Brainstorm issues the participants considered relevant, organising the discussion, linking one to another. Prior step before deciding central topic to be addressed	
for	Documentaries "Quem somos nós?" and "Remanescer"	Video production	All depending on content	Not a planned resource. Suggested by one of the participants to illustrate community issues, made by them as a school assignment (Quem somos nós) and Horta & Gastronomia activity (Remanescer)	Were used as a start to the discussion
for	Examples of eco-art initiatives	Art history/criticism	Systems-thinking, strategic, anticipatory	Stimulate ideas and will to create interventions	Discussions about legal basis of interventions in public places [OI1 20-651] Discussions about security and selective respect according to the place (public x private) [from <i>Defence</i> ] [OI1 20-671] Discussions about values [from <i>Microworld</i> ] [OI1 23-756]

### Analytic memo 3

Sust Comp	Extract	Level	Theme	Source
Normative	He telling that he saw a woman being very brute to a child who was bitten by a dog: “I almost cried... I thought of saying something, but I got scared. What a situation...”	Society	Cultural diversity	OII 1-4
Strategic, interpersonal	He suggesting a documentary they made when asked about problems in community	Society	Cultural diversity,	OII 2-38
Normative, systems-thinking	He: “I think this was the first time I paid attention to something else that my grandmother said – that lady is my grandmother – about the unity of community, that her dream is this. I have never paid attention to this! And I think that this is one of the main deficiencies here. Because it seems that the worse we are, the better we want to (compared to the one next to us) be than the other who’s next us. I see it in the neighbourhood: people are concerned not about how well the other is, but how better than they I am. (...) One can be bad and I can be bad, but I must be slightly better than they are. I think that that is a problem. (...)it also happens in the school”	Society	Cultural diversity	OII 2-67
Normative, ST	He: Ju sustains the projects. Looks like me doing school [group] assignments  (when discussing about other teachers’ participation in project)	Garden	Social sust	OII 4-120
Systems-thinking, normative	Re: The question of basic sanitation that we saw on the book. Having an education you would take care of that, because you got educated, you have learned and then you would take care of that. The question of selecting waste, rubbish. It comes from education. I think that everything comes from...  Ju: Ok, about basic sanitation is enough to take care of it?  Re: Most of it, look at the difference that would be. It wouldn’t have so much stuff, it wouldn’t be so polluted if people cared, if we had a primary education.	Society	Social + enviro sust	OII 5-162

### Analytic memo 4

Sust Comp	Extract	Source
Strategic, normative	<p>Ju - ... So let's see, from this that we are discussing, in which part could we go straight, that is easier or that you think you would like more, that would be more challenging... of changing in the community doing stuff here.</p> <p>He – Ok, but we create here and take it to the community or create here and it stays here?</p> <p>Re – Exactly what I was...</p> <p>Ju – The proposal is to change something here at CESMAR space. It may be, we can also think...</p> <p>Re – Then we go back to what we were talking. Here, all right, CESMAR, but what about outside? If we are going to do something to stay only here, it turns that it doesn't change in society. Then is going to be here. And what about who doesn't come here? It doesn't change anything, the person's life stays the same.</p> <p>Ju – So you are saying that would be more interesting, more important...</p> <p>Re – To do here and take outside</p> <p>Ju – Or doing straight outside?</p> <p>Re – Or doing outside, also.</p>	OI1 28-934
Normative, anticipatory, interpersonal	<p>Ju – Where did you take that from?!</p> <p>He – I was seated there. We went to take the pictures, they [the group] were at the other side of the valão to take the picture.</p> <p>Ju – And you jumped into the valão, is that right?!</p> <p>Pe – We haven't, look at the context!</p> <p>He – No, it was in the lake on the back. ... And then they were chatting and I was still, just existing, just breathing. I was listening... Guys, all right, it's the valão, but for me that is incredible. I was like... guys, I am so... [soft voice]</p> <p>Pe – It has been clean someday.</p> <p>Ju – Why?</p> <p>He – Not even because of being clean. It's because there is a calm place, it has nature, you see?</p> <p>Pe – But there is the valão</p> <p>He - But there is the valão</p>	OI1 29-956
Systems- thinking, normative, interpersonal	<p>Re – But the valão is valão just because of? It has dirt, if it didn't wouldn't be a valão</p> <p>He – I think that's it as well. It's very interesting what you said. Of maybe change. It's the same thing as garbage and waste. Valão... some other name for a common use space.</p> <p>Ju – To resignify.</p>	OI1 29-971
Systems- thinking, Normative	<p>Re – It goes until the Feijó brook.</p> <p>Sa – I think the beginning is the worse part, I guess.</p> <p>He – I think I never saw it.</p> <p>Re – But people say the headspring is beautiful. Clean water...</p> <p>Pe – It depends on where this headspring comes.</p>	OI1 30-989
Systems-thinking	<p>Ju - What can we change from here [pointing the paper] doing something with the valão?</p> <p>....</p> <p>He – I think that at the moment we try, some way, to change a space that deals with waste, with discard, with garbage, we are going to deal with education, waste, caring with environment, if we... we can try to provoke on population... like inviting to make something hands-on together.</p> <p>Re, Sa – Yes, exactly</p> <p>He – And then it will alter the convenience, on people realising that if they are part of this and knowing it's bad they have to do something. Because otherwise it will stay bad. Because I think people's dream is not to change community. It is to leave the community.</p>	OI1 30-994

## APPENDIX F

Learning objectives at novice level for each competence according to Wiek et al. (2015)

Systems-thinking:

Graduates are able to:

1. Create basic systems diagrams of sustainability problems, using some empirical data to illustrate elements of the problem (e.g. adverse effects)
2. Understand how sustainability problems have emerged (historical perspective)
3. Understand that different intervention points are relevant for sustainability problem-solving
4. Understand how modifications of the problem constellation (interventions in drivers) play out
5. Describe some functions of systems thinking in sustainability problem-solving
6. Describe in principle how different professional activities contribute to, or solve/mitigate sustainability problems

Anticipatory:

1. Understand different concepts about the future, including long-term, short-term; possible, probable, plausible and desirable
2. Understand cultural differences in concepts of time and the future
3. Describe intergenerational equity and its importance for sustainability
4. Describe the basic structure of scenario construction, forecasting, and visioning; link these methods with the types of knowledge they generate
5. Outline basic scenarios and visions for their own lives and for familiar systems (like their school) on different timescales
6. Describe some functions of futures thinking in sustainability problem-solving
7. Anticipate in principle how one's job might evolve over time (career trajectory) and
8. how one's professional activities might contribute to, or mitigate future sustainability problems

Normative:

1. Understand concepts of justice, fairness, and responsibility as part of the overarching concept of sustainability
2. Understand the influence of values on stakeholder actions and activities
3. Explore their own values, preferences and norms (selfdiscovery)
4. Identify value differences and trade-offs, e.g. among different courses of actions

5. Empathise with others
6. Describe the basic structure of sustainability assessments and visioning; link these methods with the types of knowledge they generate and their use in sustainability problem-solving activities
7. Describe some functions of values thinking in sustainability problem-solving
8. Exemplarily assess the sustainability effects/impact of one's job activities and envision a sustainable future for one's profession

Strategic:

1. Understand basic concepts of intentionality and decision-making
2. Understand basic theories of change (e.g. behaviour change, social transformations)
3. Understand basic concepts of barriers, assets, roles, effectiveness, etc. as part of the overarching concepts of sustainability transitions, social learning and organisational change
4. Describe the basic structure of building strategies for change (transitions, interventions) towards sustainability
5. Identify factors that affect the success or failure of transitions and interventions
6. Create basic transition strategies that intervene in a defined system or problem constellation  
Describe some functions of strategic thinking in sustainability problem-solving
7. Explore strategies how to position one's job activities in a way that it contributes to sustainability transitions

Interpersonal:

1. Understand general concepts critical to interpersonal interactions, including listening, communication, negotiation, conflict resolution, teamwork, stakeholder engagement, etc.
2. Describe the basic types, phases and techniques of teamwork and stakeholder engagement in sustainability projects
3. Work effectively and respectfully in teams on simple projects
4. Identify different groups of stakeholders relevant to a particular project
5. Conduct stakeholder interviews to build understanding of different perspectives and values
6. Understand the basic benefits of listening, communication, teamwork, stakeholder engagement, and other interpersonal skills for one's professional job

## APPENDIX G –PERMISSION LETTER (PARENTS)

Porto Alegre, 15 de março de 2018.

Solicitação de permissão para seu filho/a participar de um projeto de pesquisa

Caros pais/responsáveis

Eu sou professora de Biologia no colégio Marista Irmão Jaime Biazus e estudante de mestrado na Rhodes University (África do Sul) e tenho permissão do diretor do colégio para conduzir minha pesquisa de mestrado. Seu/sua filho/a está sendo convidado a participar no projeto de pesquisa intitulado “Uso de Eco-Arte Educação como auxiliar no estabelecimento de competências em sustentabilidade: Um estudo de caso intervencionista a nível de Ensino Médio” por ter participado do Projeto Horta & Gastronomia em 2017. O objetivo do estudo é investigar como estratégias de eco-arte educação usadas no Projeto podem estimular o desenvolvimento de competências para lidar com problemas de sustentabilidade.

A pesquisa envolverá a análise de material já produzido no ano passado, além de cinco encontros adicionais neste ano. Vocês e seu/sua filho/a poderão decidir quanto ao uso ou não de fotografias mostrando seu rosto, o modo de uso e quais poderão ser usadas. Essas fotos serão usadas apenas para fins de pesquisa e para integrar a tese final de mestrado. Eu me comprometo a trabalhar eticamente com seu/sua filho/a, que pode desistir a qualquer momento de participar da pesquisa.

Caso vocês autorizem a participação de seu/sua filho/a na pesquisa, solicito que preencha o canhoto abaixo e o envie a mim. Estou à disposição para esclarecer qualquer dúvida e fornecer mais informações.

Desde já agradeço a atenção.

Juliana Schmidt da Silva

999760969

.....  
.....

### DECLARAÇÃO

Eu, ....., por meio deste confirmo que entendo o conteúdo desta carta e a natureza do projeto de pesquisa “Uso de Eco-Arte Educação como auxiliar no estabelecimento de competências em sustentabilidade: Um estudo de caso intervencionista a nível de Ensino Médio”. Dou permissão para o/a estudante ..... participar da pesquisa.

.....

.....

Assinatura do responsável

Data

## APPENDIX H – CONSENT FORM

### FORMULÁRIO DE CONSENTIMENTO LIVRE E ESCLARECIDO

<b>Título do projeto de pesquisa:</b>	Uso de Eco-Arte Educação como auxiliar no estabelecimento de competências em sustentabilidade: Um estudo de caso intervencionista a nível de Ensino Médio
<b>Pesquisadora:</b>	Juliana Schmidt da Silva

Informações de participação
<ul style="list-style-type: none"><li>• Eu entendo os objetivos deste projeto de pesquisa e meu envolvimento nele;</li><li>• Eu entendo os riscos e benefícios de participar deste projeto de pesquisa;</li><li>• Eu entendo que posso desistir de participar da pesquisa a qualquer momento, sem nenhuma penalidade;</li><li>• Eu entendo que minha participação neste estudo é voluntária;</li><li>• Eu entendo que, mesmo as informações geradas pelo estudo sendo publicadas, eu permanecerei anônimo e nenhuma referência a meu nome será feita;</li><li>• Eu entendo que serão utilizadas gravações em vídeo, áudio e fotografias;</li><li>• Eu entendo e concordo que entrevistas ou grupos focais serão gravados eletronicamente;</li><li>• Eu entendo que terei a oportunidade de ler e comentar as transcrições das atividades;</li><li>• Eu confirmo que estou participando do estudo voluntariamente e sem ganho financeiro.</li></ul>

Explicação de informações
As informações acima me foram explicadas por: Juliana Schmidt da Silva
As informações acima me foram explicadas em português e eu domino este idioma:
<i>Sabrino M. Assmann</i>

Consentimento voluntário
Eu, <i>Sabrino Martinez Assmann</i>

por meio deste dou voluntariamente meu consentimento para participar da pesquisa acima descrita.

Assinatura:  <i>Sabrina M. Assmann</i>	Data: <i>01/09/2018</i>
--	-------------------------

**Declaração da pesquisadora**

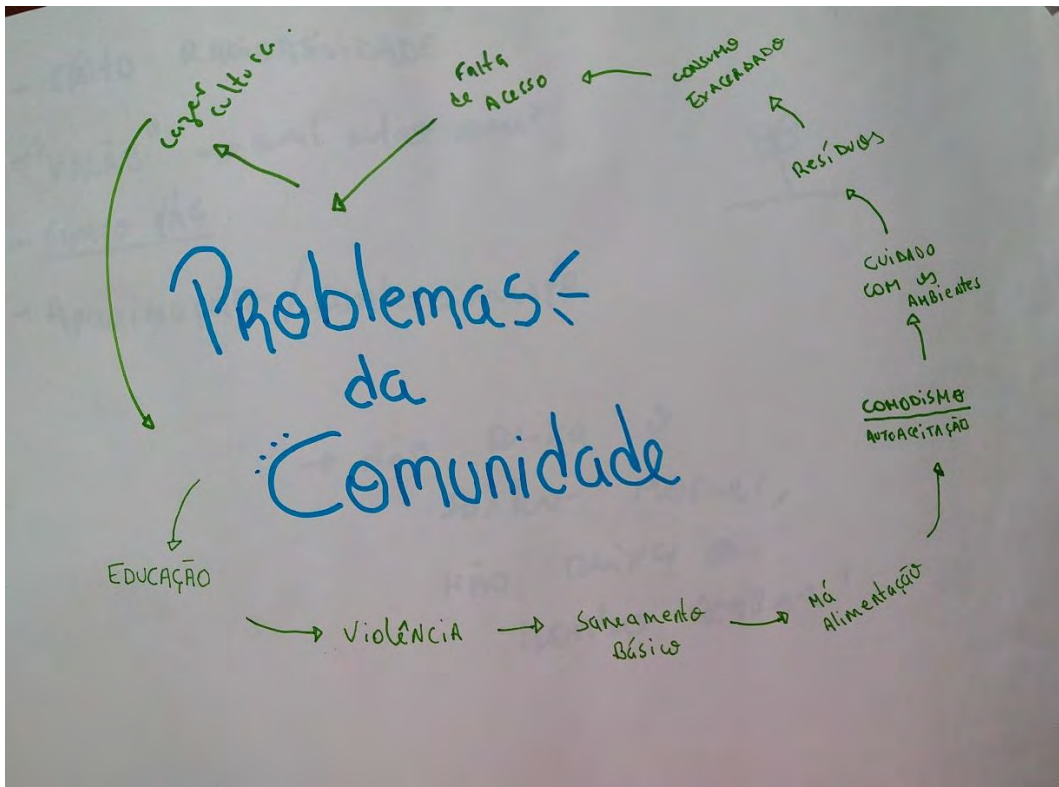
Eu, Juliana Schmidt da Silva, declaro que expliquei todas as informações para o participante e respondi genuinamente a todas as suas questões.

Assinatura:  <i>Juliana Schmidt da Silva</i>	Data: <i>18/08/2018</i>
--	-------------------------



## APPENDIX I – OUTPUTS PRODUCED AT THE POST-PROJECT INTERVENTION


### IP1-1



### IP1-2

- Efeito RADIOATIVIDADE  
- "VALÃO" → qual outro nome?  
- Espaço IHS.  
- Aproximação / conhecimento.

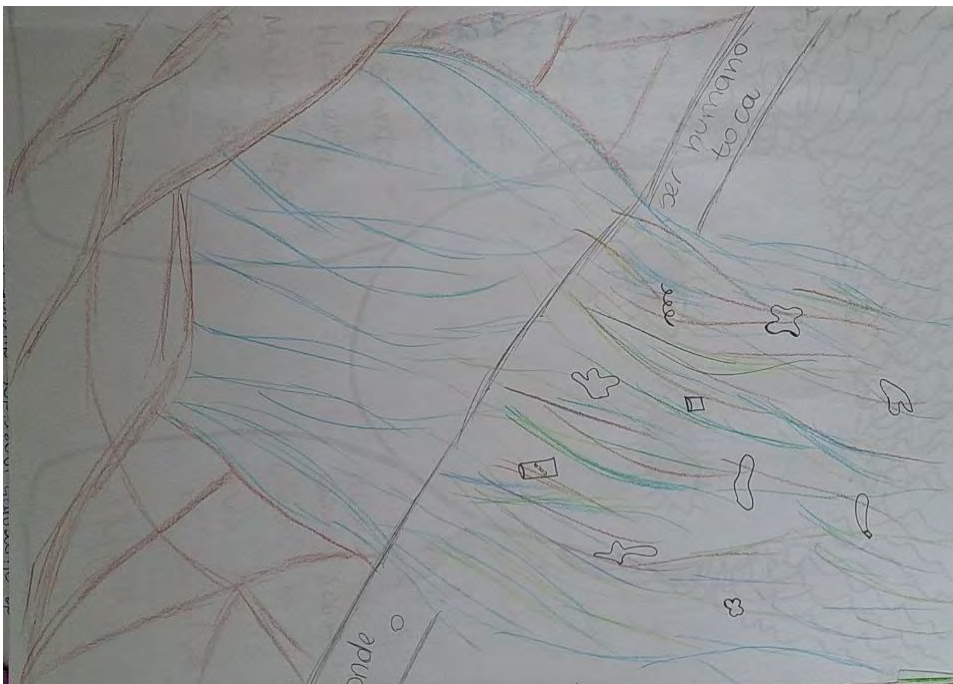
→ Não deixa o  
sonho morrer,  
não deixa o  
sonho acabar!



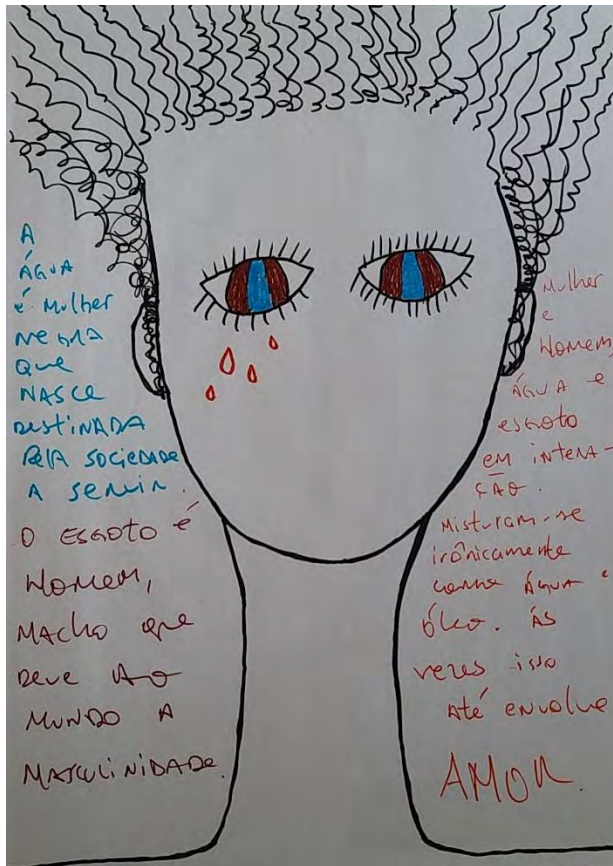
IP1-3



IP1-4



IP1-5



IP1-6



IP1-7



IP1-8

