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Mestrado em Ensino do Inglês no 1.º Ciclo do Ensino Básico

Educating for climate awareness at a primary school level setting

Luis Filipe Pereira Caldeira

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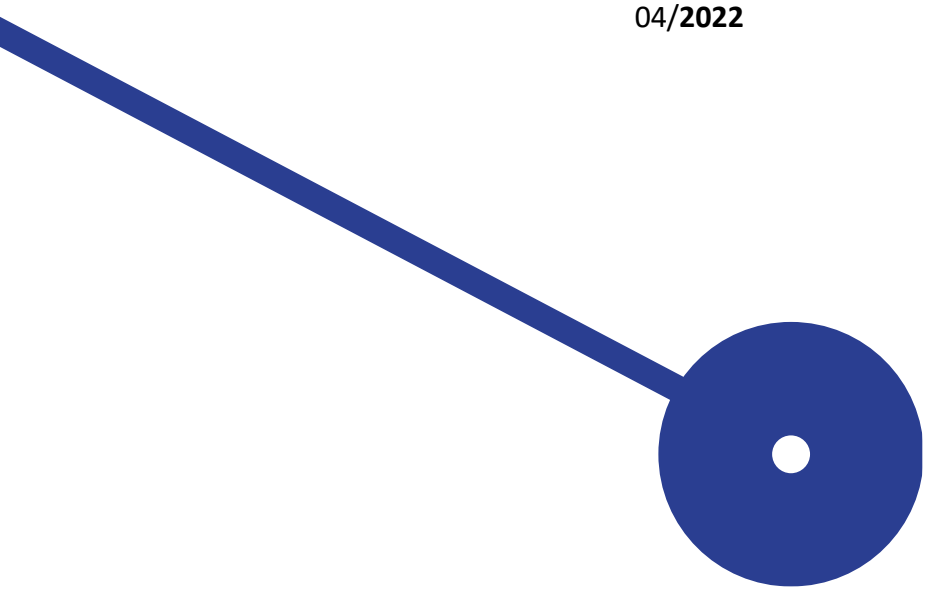

Politécnico do Porto

Escola Superior de Educação

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Relatório de Estágio

Mestrado em Ensino do Inglês no 1.º ciclo de Ensino Básico

Orientação: Prof.ª Doutora Sofia Maria Cruz de Melo Araújo

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Aknowledgments

Este trabalho, e toda esta caminhada inesperada não teriam sido possíveis sem o apoio da minha família, por primeiro me mostrarem que era possível fazer algo mais com a minha vida, e que em segundo me deram força para ir atrás do que, no verão de 2020, parecia um sonho distante.

O meu sacrifício foi ínfimo comparado ao que teve que existir na Madeira para o início e conclusão deste capítulo, e estarei eternamente grato pela oportunidade que pude ter.

Abstract

We live in a global world surrounded by constant changes, and it is urgent to make children aware of their role in the society in which they are inserted, increasingly aware of their macro-system. Using English, the global language, and by varied resources and a multidisciplinary approach, it was sought to teach a group of 4th grade students topics related to our planet's sustainability, respect, and appreciation of its diversity. This project aims to foster in students a taste for the nature that surrounds them, demonstrating that life as we have known it for centuries depends on its yields to endure, and that humans, to a large extent, display an integral part towards its proper functioning.

Thus, this study, based on a didactic intervention project developed in a 4th year primary school education class, aimed to understand how, and to what extent, it is possible to educate for global citizenship, namely through teaching about climate change and environmental awareness in an English as a foreign language class setting.

Through the use of a mixed methodology, data was created allowing to conclude that pupils showed to be receptive and highly motivated to learn about the proposed themes, usually not tackled inside a primary school context, always demonstrating positive attitudes and willingness to participate, thus being able to develop new knowledge, achieving set learning outcomes, both on the topics discussed, and, naturally, developing skills in the target language used simultaneously throughout the project.

Key words: primary school, sustainability, nature, global citizenship

Resumo

Vivemos num mundo global envolto em mudanças constantes, pelo que urge colocar, desde cedo, as crianças a par do seu papel na sociedade em que se inserem, cada vez mais conscientes do seu macro sistema. Utilizando o inglês, língua global, e através da utilização de variados recursos e de uma abordagem multidisciplinar foi procurado ensinar a um grupo de alunos do 4.º ano temas relacionados com a sustentabilidade do planeta, respeito e valorização da sua diversidade. Este projeto visa fomentar nos alunos o gosto pela natureza que os rodeia, demostrando que dependemos em larga escala dos seus frutos, sendo parte integral do seu bom funcionamento.

Desta forma, este estudo, realizado a partir de um projeto de intervenção didática desenvolvido numa turma de 4.º ano do 1.º ciclo do ensino básico teve como objetivo compreender de que forma, e com que efeito, é possível educar para a cidadania global, nomeadamente através do ensino sobre as alterações climáticas e consciencialização ambiental em aula de Inglês.

Através de uma metodologia mista foram obtidos dados que permitiram concluir que as crianças mostraram estar recetivos e altamente motivadas a aprender sobre os temas propostos, normalmente debatidos fora de um contexto de 1.ºCiclo, demonstrado sempre atitudes positivas e vontade de participar, conseguindo desta maneira desenvolver novos conhecimentos, tanto sobre as temáticas tratadas, como, de forma natural, evoluindo competências na língua alvo utilizada em simultâneo durante todo o projeto.

Palavras-chave: 1.º ciclo, sustentabilidade, natureza, cidadania global

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Abbreviations and Acronyms

CBE- Cycle of Basic Education

PES- Prática de Ensino Supervisionada

CLIL- Content and language integrated learning

CC- Climate Change

SD- Sustainable Development

UN- United Nations

UNEP- United Nations Environment Program

COP- Conference of the Parties

IPCC- Inter-Governmental Panel on Climate Change

WMO- World Meteorological Organization

GHG- Greenhouse Gases

CO2- Carbon dioxide

CH4- Methane

ESD- Education for Sustainable Development

AE- *Aprendizagens Essenciais*

FL- Foreign Language

EFL- English as a Foreign Language

PE- Projeto Educativo

PAT- Plano Anual de Turma

1 Introduction

This teaching practice report is part of the training course related to the Master's course in English Teaching in the 1st Cycle of Basic Education (CBE), in the context of the curricular unit *Seminário de acompanhamento da prática de ensino*, developed in close coordination with the curricular unit of *Prática de ensino supervisionada(PES)*.

According to the organization of the PES, students who attend the master's degree are placed in dyad, being guided by a teacher/coordinator in the school where the internship is held, and by the advisors of the higher education institution. The internship took place in the second year of the master's degree, having taken place in a group of schools in the city of Porto, where the didactic intervention project that is presented here was implemented.

Joining me in my internship were also 2 other students undertaking the same master´s degree. Despite this, due to our coordinator teacher having 16 hours of actual in-class lecture time, spread apart among 8 different classes form 3 different schools, made me and my fellow colleagues have both the opportunity to, in a coordinated effort, share some lectures, as well as the opportunity for each to develop their own distinct investigative project.

For my project, I have decided to articulate English as a foreign language teaching, together with the role of educators, in their anthropological mission, to raise awareness of the climate change (CC) phenomenon and its global implications.

The fundamental question eventually arose from the belief, and on the other hand from the discovery still quite early in my master's degree, that a teacher, no matter on which field of expertise, and regardless of the degree of education in which (s)he teaches, has a much more comprehensive and transformative role in society than I realised at first glance.

A transformative paradigm, relevant once again, since in the current context schools should not be indifferent to the need of training conscious citizens to the world around them, thus having to confer a pedagogy based on critical reflection and transformation.

Citing an article from The Guardian (Lashbrook.2021) "'No point in anything else': Gen Z members flock to climate careers", "[…] I cannot imagine a career that isn't connected to even just being a small part of a solution, says Mimi Ausland, 25, the founder of Free the Ocean, a company that aims to leverage small actions to remove plastic from the ocean."

This is an increasingly seen discourse of concern from an entire generation, which has been following the discussions, the goals outlined and failed internationally, and now begin to see and feel for the first time the consequences of climate change at a tropospheric, superficial level.

Still, while the correlation of human activities and the excess energy present on the planet is undeniable, the science behind events continues to be entangled in a mantle of terminologies and specificities, a problem simply too large and transversal to all areas of knowledge to be understood and that it should therefore be solely the job of governmental organizations and the industrial sector to "fix" the issue.

This ends up creating a feeling of apathy, helplessness, and irresponsibility among the general population.

Santos (1999) states that "all scientific knowledge aims to constitute common sense".

It was then both from personal interest, from the perspective of being able to be in contact with thousands of children, prophets of hope, throughout my career, as well as the reality observed above that the desire to research, reflect and share this project was born, inviting all those who are interested in following their call towards global citizenship, to read a sequence of theoretical and practical framework, from where the reader can guide his/her reflection and/or practice in this subject.

We fear what we do not know, and in the world of climate change, the vocabulary itself can bear fruit of some confusion. Climate science has its own specialized vocabulary, acronyms, analogies, slang. It is a language made for scientists and governments, it is succinct, specific, and useful. However, as mentioned earlier, as a means of communication for the general public it can create separation and distance.

The very structure and sequence of the report will also take into account its purpose; leading its readers to understanding the scale of the problem, from a broader to a more focused local approach, passing through where and how to act.

The report is divided into 2 main parts. Part 1 is comprised of chapters 2 and 3 where the theoretical basis will be laid down. In the second chapter I try to frame my study thematically. In the third I describe where the intervention project was implemented and in the fourth and fifth chapters (Part 2), I describe my methodological approach and analyse the data collected from it.

Therefore, in the second chapter, entitled “Education for citizenship”, entirely dedicated to a literature review, I reflect on the role of education in a globalized world, focusing on education for global citizenship. After, it will be presented a brief timeline showcasing global efforts put forward towards a sustainable planet, the scope of the analyses going from broader to narrower, from a planetary perspective, to an European one and finally ending with a Portuguese context. Lastly, the concept of content and language integrated learning (CLIL) will be explored reflecting on how this methodology can be used in an English class setting, with a perspective of educating for a global citizenship.

The third chapter, “Design of the study”, aims to put into context where and with whom this project was implemented.

The fourth chapter, entitled "Methodology”, focuses on the research methodology adopted and tools used, a methodology with contours of action-research.

In the fifth chapter" Analyses and discussion of data", the findings in chapter 4 are put into perspective and discussed. Also in this chapter, I reflect on the results of the project, re-evaluating the relevance of my didactic intervention in the context of primary school education for citizenship.

1.1 Aims

I believe that climate change education will be more and more often discussed in the future, and educators will undoubtably need further guidance when trying to tackle what seems like, at first, an immeasurable task. So, my first aim is simply to create more information on the subject, offering, myself, what I often could not find and think will be increasingly necessary, a database with both an understandable framework, coupled with an already clear and empirically tested action plan, ultimately allowing for further reflection and analyses on the subject, built towards a general public, but specially for educators seeking climate justice, inviting them to be the change they want to see.

Secondly, one of the main aims of this report is also being able, through an action-research approach, to examine and later discuss if and to which degree of effectiveness and relevance, an English as a foreign language primary school teacher can educate for climate change awareness, a theme usually tackled later in school curricula(discussed in the literature review), elevating students science capital(see chapter 4.1.1), while still maintaining the acquisition of the English language itself as a central objective of the learning process.

1.2 Objectives/stepping stones

1) This action research project, also considering its purpose, seeks to be implemented in a comprehensive way, allowing itself to be adapted to a broad range of class configurations and settings. It will then be sought during the report, and in view of the target audience, a simple and comprehendible to grasp writing style, for a comfortable read regardless of the audience`s previous knowledge on the subject;
2) Investigate, through a literature review, the potential adaptability of climate change as theme to be introduced in primary school education in Portugal;
3) Making sure the methodology and resources used during the internship will always try to be in concordance, at their core, with the learning process itself, following a self-structuring pedagogical model aware of what is expected from a teacher and student in the 21st century;
4) Compile and employ data collection tools which will allow for further discussion and interpretation of results;
5) To reflect and suggest further pertinent development paths;

2 Part 1-Education for citizenship

2.1 Introduction

This first chapter is intended for the theoretical framework on the didactic intervention project developed in the educational context of a 4th grade primary English class.

At first, it sought to reflect on the role of education in a globalized world, focusing in particular on education for global citizenship, and its assumptions, clarifying the purposes and potentialities of language education in the formation of citizens better prepared for today's societies. Next, it will be evidenced a brief timeline of some of the global efforts put forward towards a sustainable planet, the scope of the analyses going from broader to narrower, from a planetary perspective, to an European and finally a Portuguese. After that the concept of content and language integrated learning (CLIL) will be explored, reflecting on how this methodology can be used in an English class setting, with a perspective of educating for a global citizenship.

Considering that school has an extremely important role, since it has the responsibility to prepare globally competent citizens, i.e. citizens in solidarity, respecting cultural differences, prepared to deal with diversity, active and willing to participate in decision-making and problem solving, it was intended for this project to educate on all these aspects, in the framework of the activities carried out in the classroom.

Educating is not limited to training good students, but also covers the eminent need to train citizens concerned about the world and the Other (Byram, 2002, 2008; William, 2007). In this way, it is imperative to promote a quality education that sees the human being in all its dimensions and that functions as a space of academic, social, and cultural enrichment (Lourenço, 2013; Mansilla & Jackson, 2011).

Inserted in a global society, it is increasingly important that we all have, from an early age, a notion of belonging to that society and awareness of the need to seek local and global solutions. Education faces then a challenge: working with students' skills that allow them to actively participate in the society in which they are inserted, "open students' eyes and minds to global problems" (Mansilla & Jackson, 2011).

2.2 Sustainable development

The exploitation of the planet's natural resources is fundamental to the survival of the human being. However, over thousands of years society has not put forward the hypothesis of the depletion of those natural resources, seeing nature as virtually unlimited. The fact that these resources seem abundant, and infinite, has led people to use them carelessly and excessively, without having any notion of the consequences that their exhaustion would have in the future, endangering not only the lives of human beings, but also of all life forms on Earth. This has led to the existence of a global

planetary crisis, arising problems of different dimensions, such as global warming, droughts, floods, hurricanes, destruction of the ozone layer; depletion of natural resources, increased asymmetries between the poor and the rich regarding access to goods, services and natural resources, the loss of bio cultural diversity, and a plethora of other problems (Sá. 2012).

These problems have begun to raise enormous concern on the part of populations around the world, strengthening studies on different topics, making it increasingly urgent to create solutions and agreements between countries to combat this menace.

The concept of sustainable development (SD) was created at the Stockholm Conference in 1972, denouncing, for the first time, the concern with economic growth to the detriment of the environment, noting that the traditional model of economic growth would lead to the complete exhaustion of natural resources, endangering life on the planet (Gadotti. 2002, p. 1).

The main result of this conference was the Declaration on the Human Environment or Stockholm Declaration, where the right to life was established and recognized in a healthy and undegraded environment of present and future generations (Gadotti. 2002). In this declaration there are 26 principles that support the preservation of natural resources and recognize that they need adequate management in order not to be exhausted. The debate between the 113 countries participating in this meeting, as part of the United Nations (UN), was ignited by the need for a new model of economic development. This model could not induce the depletion of natural reserves, such as oil.

The concept of SD emerged, with greater visibility, in the 80s of the last century, namely in the report *The Global Strategy for Conservation* (IUCN, UNEP, WWF, 1980). This report calls for a new international development strategy to achieve a more stable and dynamic world economy, combating the impacts of poverty, stating that nature conservation cannot be achieved without development to alleviate the poverty and misery of hundreds of millions of people and emphasizing that the interdependence between conservation and development depends on caring for the Earth.

This concept was then adopted by the COMMISSION on Environment and Development, established by the UN in 1983, which incorporated it into a document that would come to be known as the Brundtland Report(Our common future.1987) and would only be ready in 1987. Without a doubt, the environment and the transformations of the planet were already part of the political agenda of leaders from all over the world. But until we got to the point where sustainability and SD had so much attention, a considerable path was taken, with the Brundtland Report being one of the main milestones in this trajectory. This report, signed by 21 members of different nationalities, was important, on the one hand, because it showed that the environment and development are inseparable, on the other hand, because it was considered highly innovative for that time, being the first document to bring to public discourse and political debate the concept of SD.

This concept was defined as "the development that meets the present needs, without compromising the capacity of future generations to meet their own needs" (Barbosa, 2008, p. 2). In other words, SD means enabling, both now and in the future, that the human population achieve a satisfactory level of social and economic development through a weighted use of natural resources, preserving species and habitats. On the one hand, it seeks to establish a harmonious relationship between man and nature as the center of a development process that must satisfy human needs and aspirations; on the other hand, it emphasizes that poverty is incompatible with sustainable living practices and indicates the need that environmental policy should be an integral part of the development process and no longer fragmented sectoral responsibility.

Although it is a widely used concept, there is no single view of what SD is. According to the document *Review of Contexts and Structures for Education for Sustainable Development 2009* (UNESCO, 2009), SD is defined as a vehicle, on a global scale, to express the need to rethink the current dominant models, unable to create a balance between the needs of people and the planet, in search of an environment in which peace and prosperity are benchmarks. SD takes on an economic dimension that calls for the more rational use of natural resources and the use of more efficient and less polluting technologies. On the other hand, SD is also seen as a social project aimed at suppressing poverty, raising the quality of life and meeting the basic needs of humanity, considering the appropriation and sustainable transformation of environmental resources.

In view of these different interpretations, we can understand SD as a concept of global development, which must be seen and addressed from an integral perspective, responsible and conscious consumption of natural resources; equality and equity and a long-term perspective; environmentally sustainable attitudes to preserve natural goods and human dignity. In a sense, it is development that does not deplete resources, reconciling economic growth and preservation of nature.

This concept is thus strongly associated with the need to preserve and manage, in a futuristic vision, natural resources and environmental quality, but its notion is much broader and understands the complexity of the interactions that occur between society, the economy and the environment, with culture being the basis of these interactions (UNESCO, 2005; P. Sá, 2008; S. Sa, 2007). SD is considered a "constantly evolving concept; it is thus the will to improve everyone's quality of life, including that of future generations, by reconciling economic growth, social development and environmental protection" (UNESCO, 2005, p. 3).

UNESCO understands that SD, in addition to the economic, social and environmental dimensions, also implies the cultural dimension (UNESCO, 2002).

The global crisis that is being faced by Humanity reflects our collective values, conducts and lifestyles and, therefore, it is also a cultural crisis.

Thus, culture is considered an inseparable part of the complex concept of SD.

In a sense, each of these domains has its particularities and practices, since they are of a different nature, so each of them can gain more weight than the others, developing more than the others, depending on the problems and characteristics inherent to each one. However, in the end, no dimension can be forgotten, and there must be balance between all. Only in this way, respecting each and every dimension, is there a possibility for SD.

It can be said that the concern of the human being for the planet, especially over the last decades, has taken on an increasing proportion. Several events marked the evolution of the concept of SD, also contributing to the increase in the awareness of the world's populations on environmental, social and economic issues. Highlights include the Rio Summit, the establishment of the Kyoto Protocol, the Johannesburg Summit, the Bali Summit and, more recently, the Paris agreement and COP 26.

The Rio Summit, also called the United Nations Conference on Environment and Development, took place in 1992 in Brazil and was attended by more than a hundred countries. It is recognized that this Summit was a great success in that it made the public aware of the need to fully integrate environmental and social concerns into economic development policies. Topics such as the existence of human interference in the global climate, estimates of the loss of genetic biodiversity and the increasing desertification and over-exploitation of the oceans were discussed and an action plan for SD was adopted that established the importance of each country in committing itself to reflect on local and global solutions to socio-environmental problems, (Agenda 21.UN.1992).

In 1997, the 3rd United Nations Climate Change Conference was established in the Kyoto Protocol, an international treaty in which signatory countries pledged to reduce their greenhouse gas emissions into the atmosphere. The United States and Canada refused to ratify the Kyoto Protocol on the grounds that the agreed commitments would be negative for their economies (UN, 1998).

Of utmost importance and for a more comprehensive understanding of the concept of SD was the world summit that took place in Johannesburg in 2002. This conference was the most important initiative taken so far in terms of environmental conservation. The conference highlighted differing views between the northern (developed) and southern (developing) countries: the northern countries were concerned about the deterioration of the environment and the rapid depletion of the planet's resources, and acknowledged that the greatest danger comes from dividing the world into the rich and poor; the southern countries considered that the main problem was the development of their economy and that environmental problems were only the concerns and responsibility of rich countries; moreover, for these countries, the convention only served to solve the (environmental) problems of the northern countries.

In this convention, the 5th of June each year was proclaimed the World Environment Day, and the UNEP (United Nations Environment Program) was also created, which aims to transmit to the international community environmental knowledge, through the

development and dissemination of appropriate tools and political instruments (UN, 2015).

It is also important to highlight the Bali summit in 2007, which aimed to create a successor to the Kyoto Protocol, but with more demanding climate change targets. This summit brought together more than 10,000 participants, including representatives from more than 180 countries (USD. 2008). The highlight of the conference was the divergences between the EU and the United States of America (USA). The EU had already presented a plan to combat climate change before the start of the Bali summit. On the other hand, the USA has been reluctant to accept mandatory greenhouse gas reductions by 2020.

After years of negotiations and hesitations, representatives from 195 countries signed a climate change agreement signed in December 2016 in Paris (UN, 2016). Among the signatories were some of the world's largest industrial powers and several major emitters of greenhouse gases, such as China, the United States, India, Japan, and several EU countries. This agreement was the first universal pact to combat climate change with mandatory compliance and determined that the 195 signatory countries should sign a compromise to keep the global average temperature rise well below pre-industrial levels and to make efforts to limit the temperature increase to 1.5°C above pre-industrial levels, with the central objective of strengthening the global response to the threat of climate change and strengthening countries' capacity to deal with the impacts of these changes.

The basis of the agreement is its national plans, to be presented every five years by all countries, thereby contributing to the fight against global warming. It is a doubly different approach to that which has been so far in climate diplomacy. There are no targets imposed on countries, they decide what to do. And everyone must participate, not just developed countries, although they must lead efforts to reduce greenhouse gas emissions.

To date, this is the first time that an international agreement has emerged, with legal force, to bind all countries to make efforts to curb their emissions.

Despite criticism that it lacks ambition, this agreement has been seen as a historic step, because of its universal character and for overcoming divergences that have so far prevented a replacement from the Kyoto Protocol.

Finally, I highlight the latest (2021) edition of the Conference of the Parties (COP).

COP is the highest-level meeting of governments as part of the United Nations Framework Convention on Climate Change (UNFCCC, 1992), with the goal of agreeing on a strategy to combat climate change on a global framework.

COP 26, based in Glasgow in November 2021, aimed to reflect, analyze, and expand some aspects addressed at the Paris conference 6 years earlier.The results obtained through this conference divide opinions, on one note it was a massive success since the draft agreement asks governments to "accelerate the phasing-out of coal and subsidies

for fossil fuels." (Draft on 1/CMA.3. 2021. Pg.4). This seems obvious as phasing out fossil fuels is necessary if greenhouse gas emissions are to decline. But the inclusion of specific language on this is a big step forward, since previous agreements haven't mentioned coal and fossil fuel subsidies specifically.

Article 6 of the Paris agreement regarding emissions trading was also finally approved, where with "effective rules on transparency and robust accounting international emissions trading can mobilize significant private sector investment and help the world meet the ambitious climate and development goals established in the Paris agreement" (COP 26: Implementing Article 6 of the Paris Agreement, 2021).

On the other side of the spectrum, COP26 was also a failure, with some reports saying the conference was exclusionary, failing to deliver to marginalized communities, and nowhere near enough progress was made on climate finance to support the global south with renewable energy infrastructure. There are many possible conclusions to be taken from the latest global gathering concerning climate change, each varying with the lenses of who sees it; therefore, it is not possible to form one single cohesive thesis statement, each opinion varying depending on how one views, or considers, "progress", in climate change.

Policy makers see climate change through the lens of existing powers, those in the global south tend to look at it as an existential threat, emblematic on the unjust nature of economics, where those who contribute less to the crisis are the ones who suffer most from it. I see the conference through the lens of both an educator, and an environmentalist, analysing how the physical system of the atmosphere will respond to the actions of this conference.

COP26 made progress: It will reduce the total amount of CO2 in the atmosphere and the total warming eventually experienced, yet the pledges made at the conference were not radical enough to avoid warming that earth modelling indicates will likely be extremely harmful, surpassing the maximum agreed threshold value of an added 2ºC above pre-industrial levels by 2100, agreed at the Paris agreement.

Ultimately, almost irrelevantly through which lens one sees climate change strategies, the desirable outcome is the same across societies, cultures, and governments, that is, to keep the global climate as close as it´s been in the near past as possible. To accomplish said goal, coordinated cooperative action on a scale the world has never seen before is needed. Crucially, action needs to come across society and through several decades.

We will only accomplish this goal if the majority of people are on board with reducing greenhouse gas emissions, and stay on board for decades.

This leads to how most people perceive and educate themselves about the climate crisis being crucial, needing to understand that the situation is bad, but fixable.

The events and summits that have been taking place in recent years reveal a growing concern by the world population with the challenges facing planet Earth. However, we

can see that, despite this concern, there is still a long way to go for these treaties and conventions to be complied with by world governments.

2.3 Climate change kaleidoscope

Climate change is an increasingly important and urgent issue. Increased greenhouse gas emissions and changes in land use cause profound changes in the atmosphere and cause changes in weather patterns.

The inter-governmental panel on climate change (IPCC) was created in 1988 by the world meteorological organization (WMO) and the United Nations environment programme (UNEP). It provides regular assessments of the scientific basis of climate change, its impacts, and future risks. It describes climate change as "a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties and that persists for an extended period, typically decades or longer" (IPCC.2014a).

The cause of such changes can consist of natural processes or, most relevantly since the industrial era, of anthropogenic changes. Anthropogenic change is caused by the emission of greenhouse gases (GHG) into the atmosphere and by changes in land use, which result in shifts in the climate patterns (IPCC.2014a).

In the figure below, it is visible how the mean global temperature has sharply increased, mainly due to the mentioned anthropogenic changes:

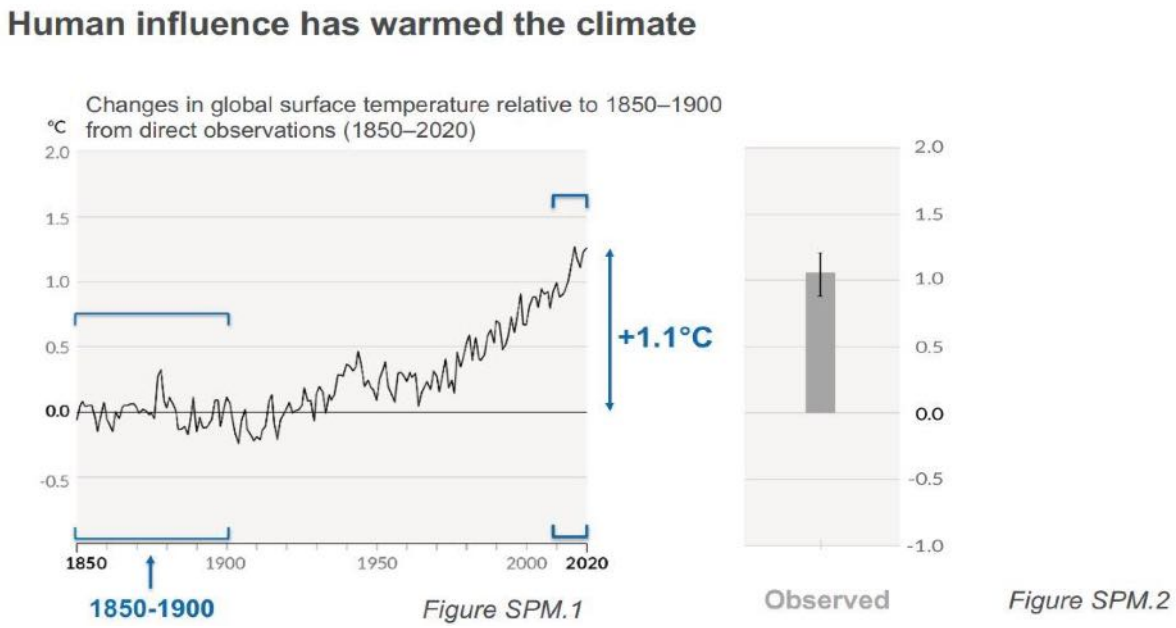

Ilustração 1--Sixth assessment report (IPCC.2021). The physical science basis.

The following data (Figure 2) reports through which means this deviation in temperature was triggered:

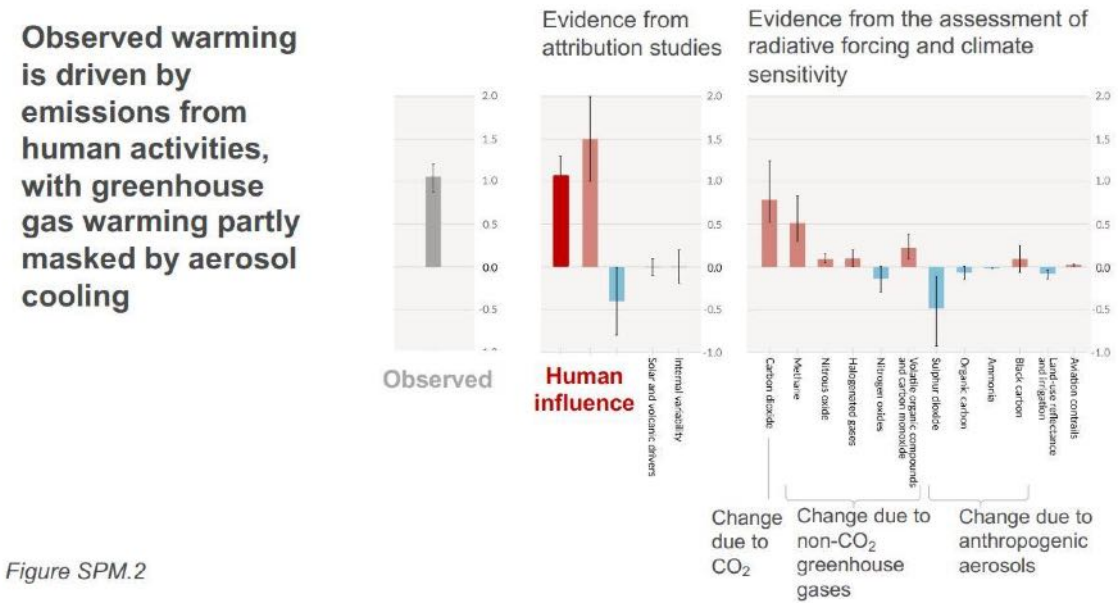

Ilustração 2-Sixth assessment report (IPCC.2021). The physical science basis.

This report allows to demonstrate the impact of human influence on climate change, while describing through which means it has been happening, showcasing the impact of Carbon dioxide (CO2) and Methane (CH4) gas emissions.

The following report (Figure 3) serves to demonstrate the rise of global average temperature, when compared to CO2 emission scenarios, on a near-term scale:

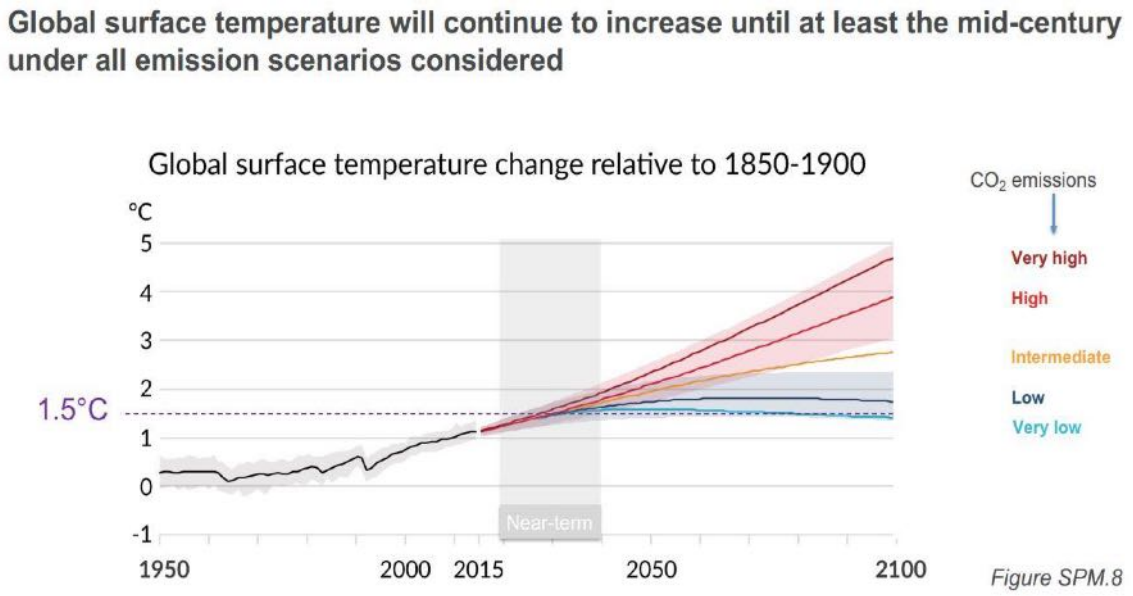

Ilustração 3-Sixth assessment report (IPCC.2021). The physical science basis.

The report shows that even on a "low" emission scenario, the 2°C warming ceiling objectivized in the Paris agreement as a worst-case scenario in 2015, is now an almost inevitability.

Finally, the following report (Figure 4) shows, in a brief manner, the impact of climate change, through its influence on the global average temperature increase, on a tropospheric level:

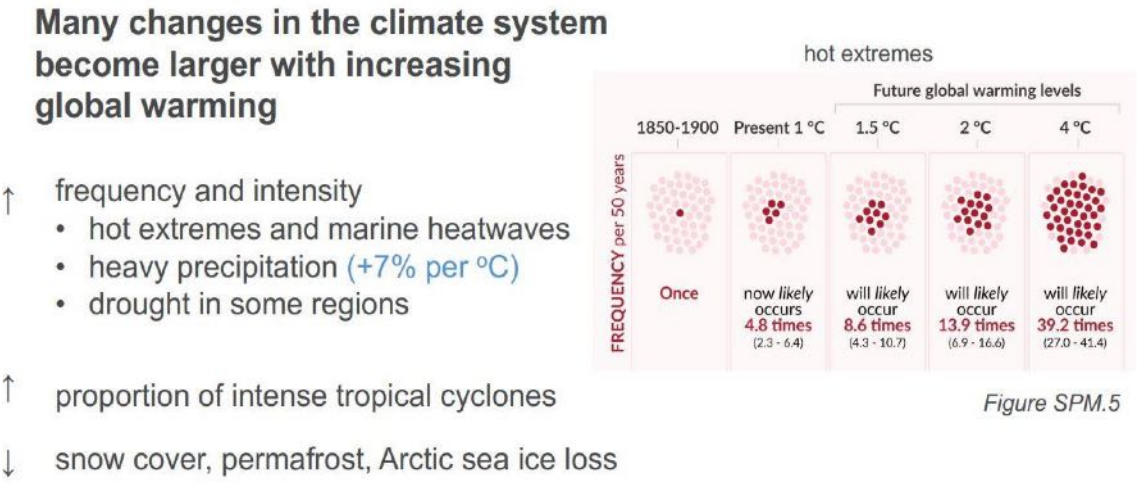

Ilustração 4-Sixth assessment report (IPCC.2021). The physical science basis.

Through this report, the connection between human action, and consequence become visible. Extreme events that occurred once every 50 years between 1850-1900 are already happening an average on 4.8 times every 50 years, the scenarios getting exponentially worse with future warming and through positive feedback-loops.

A positive feedback-loop is a process through which a climate behaviour is self-amplified, reinforcing itself in a cycle.

When trees die, by natural processes, namely by fire, they release into the atmosphere the carbon stored within them, which is why the effect of wildfires on emissions is among the most feared climate feedback-loops; where forests who would typically be carbon sinks, turn into carbon sources, unleashing all their stored gas back to the atmosphere.

Another is the ice-albedo feedback. When ice melts, land or water take its place, those being less reflective than ice, thus absorbing more solar radiation, causing more warming, which in turn causes more ice to melt, the cycle continues. For this reason, the IPCC predict polar temperatures will rise twice as much as the rest of the world, in a process called polar amplification.

If drastic measures are not taken to control global warming, the planet will face very difficult times. Hurricanes, wildfires, droughts, and floods will be increasingly frequent. The planet's temperature may rise by more than 2°C in relation to the temperature at the beginning of the Industrial Age, with a high risk of mass extinction of species, collapse of ecosystems, lack of food, water scarcity, diseases lost for centuries, captured in permafrost, released again, millions of refugees, and major economic damage. In addition to these serious environmental problems, social inequalities have not been

eased, the distribution of wealth is not yet equitable, it is necessary to sensitize society to decide in favour of the sustainability of the Earth, changing overall behaviours.

And it is in this context, that the importance of education arises.

2.4 Educating for climate awareness

> "Young people are the future of our planet. We must equip them with the information, insight, and practical skills to understand the importance of biodiversity […] Educators have a key role to play in preparing young people for the challenges that lie ahead. There can be no greater legacy than giving young people the tools they need to save our planet"
>
> Sir David Attenborough

For the problems previously mentioned to attenuate, it is necessary to make a profound change regarding some habits incorporating small attitudes that involve environmental awareness. This change is only possible through a comprehensive form of education, which proposes to reach all citizens, through a permanent participatory process that seeks to instil a critical awareness about the environmental problem; because it is through education that the awareness of the situation we live in, the need to change habits, and the idea that human beings are responsible for this global planetary crisis is transmitted. Moreover, the current environmental problem reveals, first, a crisis of civilization itself. It is not nature that is in disharmony, it is society itself and their values.

Then comes the role of education as a promoter of sustainability and climate awareness. Indeed, education is the fundamental pillar and the basis for the progress of all peoples. In view of the above assumptions, education has the role of training responsible and conscious children and young people for the fact that their attitudes and behaviours have consequences, which may not be visible immediately, but in the long term. In fact, knowledge and education have never been as important as in today's world.

It is clear that in order to improve our quality of life and grow both materially, morally, and spiritually, we must learn to respond to the new challenges of our time, which are neither linear, nor simple, nor one-dimensional: A kaleidoscope. And it is in this sense that environmental education must be present at all levels and modalities of the formal and non-formal educational process. Due to its humanistic, holistic, interdisciplinary, and participatory character, this type of education can contribute greatly to renew the educational process, bringing the permanent critical evaluation, the adequacy of the contents to the local reality and the involvement of individuals in concrete actions to transform reality. The integration of SD into the curriculum at the global and transdisciplinary level should prepare students to think holistically, and critically.

Environmental education aims to sensitize individuals to the importance of our historical and ecological heritage. It seeks to stimulate the change of attitudes and habits through the understanding of the limits and potentialities of each one, as well as by the

development of ethical awareness, which allows people to understand and respect themselves and the planet more as coexisting and interdependent.

According to Pressoir (2008), education for sustainable development (ESD) should be seen as:

"A new vision of education capable of committing people to the conservation of the environment and the planet, of promoting an education for democracy, a value-based education, oriented towards the promotion of human rights and based on literacy for sustainability" (S. Sá, 2012, p. 45, citing Pressoir.).

ESD presents as a main objective the integration of the theme of sustainability in curricula, which can be done through the treatment of content and the implementation of projects, the promotion of attitudes and behaviours. Therefore, it is desirable to use concepts and tools in different areas and disciplines so that children better appreciate and respect the world in which they live. Education allowing us to understand more broadly the natural, social, and cultural environment.

2.4.1 Climate change and ESD in Portugal

Current global and regional trends, as well as climate projections for the future, point to a worsening of extreme weather events around the world. Marreiros. (2019) affirms that "In the European context, Portugal is particularly vulnerable to climate change due to its location, as the Mediterranean is the European region with the greatest impact, and the Iberian Peninsula in particular has been the target of the highest temperature increases in Europe, and these trends are projected to continue to worsen." Adding that "the increase in heat wave episodes and forest fires, the decrease in the volume of precipitation (with consequent worsening of drought situations), and the rising sea level have been impacting Portugal and are projected to keep worsening in the future." (Transation,mine)

The Portuguese head of state has stated that "it is fundamental to look at the post-pandemic (Covid-19) situation as an opportunity to support economic growth, in an effective ecological transition, recognizing the urge to reduce the consumption of natural resources […] (Lusa.2021)

This sentiment appears to be shared among the Portuguese population, when according to Carvalho, P. (2021, April 29)" over two-thirds of the Portuguese population want more demanding goals towards climate action, in a survey made by 12 European countries, Portugal ranking 4th among the 12, with 72% of the inquired wishing the government would strengthen its efforts to reduce GHG emissions.

The IPCC (2018): Summary for Policymakers, stated that the projected risks will be different according to locations, level of development and choices of adaption and mitigation options. Due to increased temperature, heat-related health impacts, forest fires and extreme weather events are some of the projected risks from global warming already at a 1.5°C increase, the following figure representing the risk increase of heatwave[1] frequency, when comparing 1971-2000 to 2071-2100, on a controlled period from May to September, based on a medium emission setting:

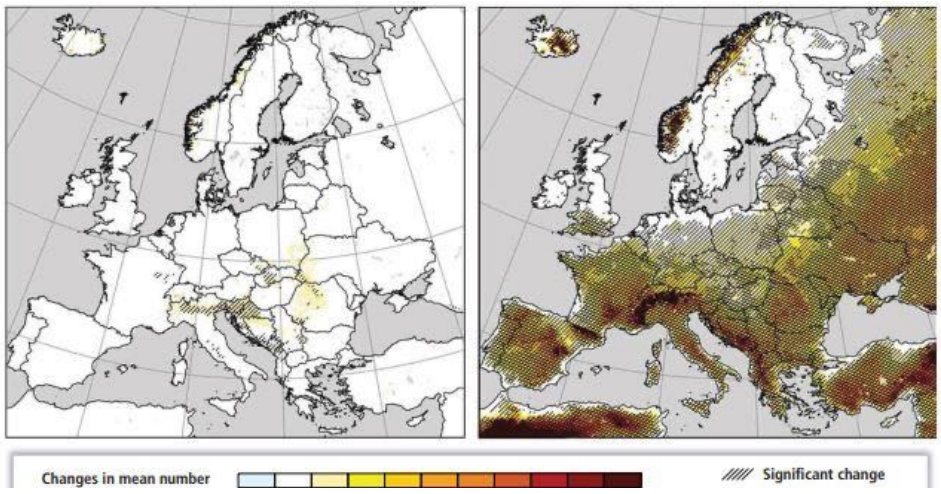

Ilustração 5-Climate change 2014: Impacts,Adaptation and Vulnerability.IPPC(2014

[1] Heat waves are defined as periods of more than 5 consecutive days with daily maximum temperature exceeding the mean maximum temperature of the May to September season of the control period.

Using data from 732 locations in 43 countries to estimate mortality burdens associated with the additional heat exposure that has resulted from recent human induced warming from 1991-2018, Cabrera,V (2021) found that 27% of heat related deaths in Portugal can be attributed to anthropogenic climate change.

The wood and paper sector accounts for about 10% of exports of goods and 2% of Gross Added Value (VAB), a figure only surpassed in Europe by Finland and Sweden (RCM n.º 6-B/2015 2015).

Despite these numbers, forests fires burn thousands of hectares every year, generating massive ecological and economic losses (RCM nº 6-B/2015 2015)

Adaptation is then needed, according to (EEA 2013; Climate-ADAPT 2017). “Soft adaptation actions […] potentiate adaptive capacity and increase awareness about climate change; two examples are environmental education and extreme weather warning systems.”(Parry et al.2009).

The Portuguese government committed itself in 2016 to ensuring the neutrality of its emissions by the end of 2050, drawing a clear vision of the deep decarbonization of the national economy as a contribution to the Paris agreement and in line with the most ambitious efforts underway at international level. (RNC 2050.2019)

The *Roadmap for Carbon Neutrality 2050* (RNC 2050) is a national document which establishes, in a sustained way, the path to achieving carbon neutrality in 2050, defining guidelines and identifying cost-effective options for achieving that end, in different socio-economic development scenarios in Portugal.

It was then established that Portugal should reduce its GHG emissions from -18% to -23% in 2020 and from -30% to -40% in 2030, compared to 2005 figures, contingent on the results of the European negotiations.

Figure 6 showcases the steady decline in CO2 emissions derived from fossil fuels gases in Portugal, from 1995 to 2019, highlighting its 2005 peak in emissions; its 2017 outlier, mainly due to massive wildfires in the summer that year (according to RNC 2050.2019), leading to the release of thousands of tons of CO2, trapped inside the vegetation, to the atmosphere:

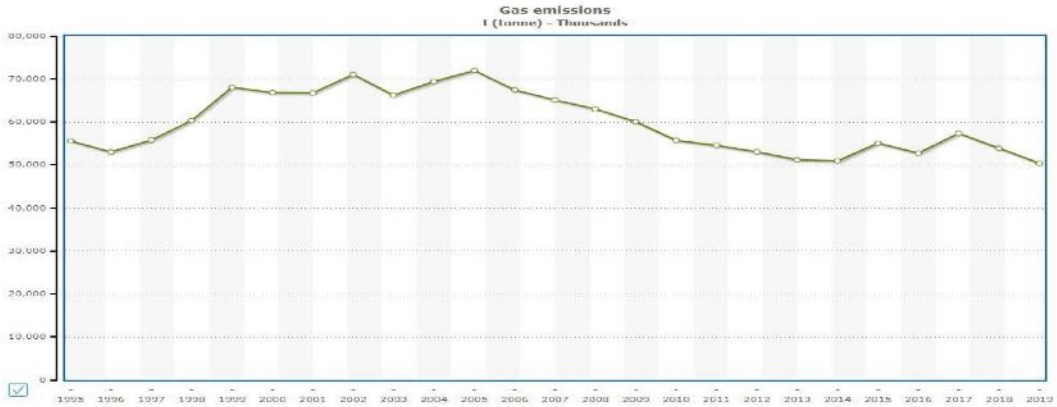

Ilustração 6-INE(2019).Retrived from Pordata

Portugal has then maintained the pledge, along with other European countries to steadily reduce Greenhouse gas emissions, as shown in the figure below:

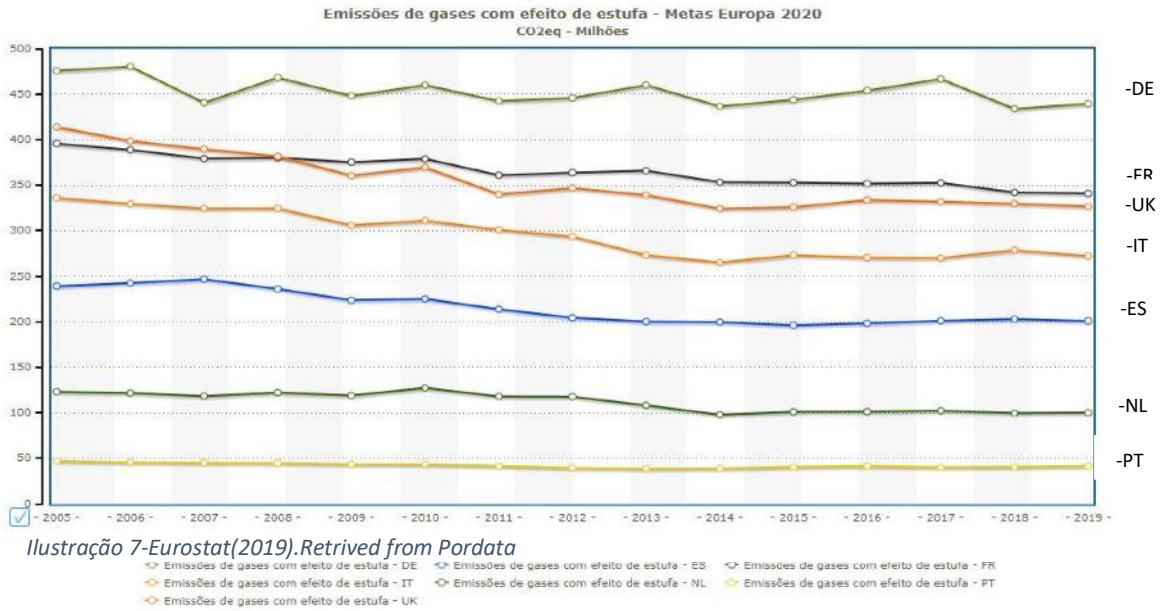

Ilustração 7-Eurostat(2019).Retrived from Pordata

Many factors contribute for this tendency, one of them is "involving society in climate change challenges, betting on education, information and sensibilization; contributing to increase individual and collective action. RNC 2050 (2019)

According to a survey by the Special Eurobarometer on climate change (2021):

- More than one in five respondents in Portugal (22%, compared with the EU average of 18%) consider climate change to be the single most serious problem facing the world.
- As in 2019, climate change ranks second in Portugal, just behind poverty, hunger, and lack of drinking water (23%, above the EU average of 17%).
- Respondents in Portugal are the most likely in any EU Member State to think that climate change is a very serious problem (91%, largely above the EU average of 78%)
- The cost of damage due to climate change is much higher than the investment needed for a green transition (91%, above the EU average of 74%)
- Nearly nine in ten respondents (87%, largely above the EU average of 75%) think that the money from the economic post pandemic recovery plan should mainly be invested in the new green economy.
- 60% say they have recently acted to combat climate change. However, when asked about concrete actions (e. g. adopting energy efficiency measures at home, acquisition of efficient appliances, etc.) the positive responses are still very little expressive.

These results suggest that the Portuguese, as consumers and citizens, recognize climate change as a problem but expect the government, businesses, and local and regional authorities to act. It is therefore necessary to reinforce the notion of the importance of the contribution of individual action through changes in behavior and lifestyle.

“Schools reflect society, and society reflects the schools. (Fowler.2001).

Under this premise, education has a big role to fill in regarding the combat to climate change, but how is the Portuguese educational system trying to convey to its students what 91% of Portuguese think is a very serious problem?

2.4.2 Portuguese normative documents and legislation

Very competent, is the least that can be said or even expected of students who will complete secondary education in the upcoming years. At least considering the skills profile that is expected of students when leaving compulsory schooling in Portugal.

The *Perfil dos alunos à saída da escolaridade obrigatória (2017)* is a national education document officially approved on July 26th, 2017, under the 6478 dispatches. It draws from the *21st Century Skills and Competences for New Millennium Learners in OECD Countries* (2009) and affirms itself as “a benchmark for decisions to be adopted by decision-makers and educational actors at the level of educational establishments and bodies responsible for education policies, constituting a common matrix for all schools and educational offers in the context of compulsory schooling.” (pg.13)

This document is structured in Principles, Vision, Values and Areas of Competence:

- The principles substantiate and give meaning to each of the actions related to the execution and management of the curriculum in the school, in all disciplinary areas.

- The Student Vision, resulting from the principles, explains what is intended for young people as citizens when they leave compulsory schooling.

- Values, within the educational system, are understood as guidelines according to which certain beliefs, behaviors and actions are defined as appropriate and desirable, expressing themselves in the way people act and justify their way of being and acting.

It can be considered that they are based on the relationship constructed between reality, personality and context factors, a relationship that is expressed through attitudes and behaviors.

- The Areas of Competence are composed of competencies resulting from complex combinations of knowledge, skills and attitudes that allow effective human action in diverse contexts.

These areas are of a different nature: cognitive and metacognitive, social, emotional, physical and practical. It should be noted that competencies involve knowledge and attitudes associated with social, organizational, and ethical values.

In the figure bellow, it is shown (in the same as in the official document) all the above stated principles, values, and competences:

Ilustração 8-Conceptual scheme of Perfil dos alunos à saída da Escolaridade Obrigatória(2017)

It is stated in one of its principles that "every action should be sustained from a solid and robust theoretical knowledge" (pg.13).

"The school contributes to forming in the student's awareness for sustainability, one of the greatest existential challenges of the contemporary world […], whose fragile and complex balance depends on the historical continuity of human civilization." (Pedroso et al.,2017, pg. 14). This statement is presented as a principle in this national document, a principle being described as what justified and gave meaning to the document's creation in the first place; it is therefore of key importance.

In *Perfil dos alunos à saída da escolaridade obrigatória* (2017, pg. 27*)* an entire competencies section regarding environmental causes is presented:

The competencies in the area of Well-being, health and environment concern the promotion, creation and transformation of the quality of life of the individual and society.
The competencies associated with well-being, health and the environment imply that students can:

• understand the balances and weaknesses of the natural world towards the adoption of behaviors that respond to the great global challenges of the environment.
• manifest environmental and social awareness and responsibility, working collaboratively for the common good, with a view to building a sustainable future.

Estratégia nacional de educação para a cidadania (2016), states that "we live in a world with global problems such as climate change, extremism, inequalities in access to goods and fundamental rights and humanitarian crises, among others, where the solution is to work together, joining forces to find solutions to the challenges that threaten humanity."

The future of the planet, in social and environmental terms, depends on the formation of citizens with values not only to understand the world around them, but also to look for solutions that to put us on the path to sustainable and inclusive development.

It importantly states that in primary school, the concept of citizenship should be "Integrated transversally in the curriculum […] consists of as a space for enhancing the valorisation of an interdisciplinary approach, every time there is curricular interconnection with other disciplines".

Another staple document in the Portuguese education system is *Aprendizagens essenciais(AE)* (2018), them being the "the common set of knowledge to be acquired, identified as the contents of structured disciplinary knowledge, indispensable, conceptually articulated, relevant and significant, as well as skills and attitudes to be developed mandatorily by all students in each disciplinary area or discipline, having, as a rule, by reference the year of schooling or training". (Decreto-lei n.º55/2018).

AE aims to build "a global citizen's own identity in the relationship with others, based on attitudes and values, such as respect for the other and, in the specific scope of the English language, Anglo-Saxon culture, as well as other cultures in the world, responsibility and cooperation between individuals and peoples, with individual and collective repercussions."

Its objectives are often intertwined with the values sought after by *Perfil dos alunos à saida da escolaridade obrigatória* (2017), the two documents working in a collaborative way, serving as a beacon of didactic guidance for teachers in Portugal. They are not the minimums to be achieved for the approval of a student, but instead the common basis of reference.

There we find that 4th grade students in Portugal should be able to "relate the increase in the world population and the consumption of goods with changes in the quality of the environment (destruction of forests, pollution, depletion of resources, extinction of species, etc.), recognizing the need to adopt individual and collective measures that minimize the negative impact." (pg.10)

Ultimately this approach allows for curricular autonomy and flexibility so that, in each school, articulated work can be promoted between the AE and the other learnings provided for in the other curricular documents, with deepening of themes, diversified interdisciplinary explorations, mobilization of local components of the curriculum, among other options, within the areas of curricular autonomy.

It was through this interdisciplinary approach that this project could develop.

2.5 CLIL as a cross curricular approach tool

> "The transdisciplinary teacher is the one who tries, from their levels of perception and consciousness, to potentiate, build knowledge and access the information that is present in the other levels of reality, through the recognition of the constitutive complexity of life, which brings with it a more unifying and global view of its dynamic and the function of reality."
>
> Moraes in *The teaching training process from the complexity and transdisciplinarity, 2007, pg.31*

The CLIL approach "makes teachers aware of their responsibility to educate the 'whole' child" (Ellison, 2019, p. 262) and to prepare them for the 21st Century society we are living in, by following both emancipatory and creative and interdisciplinary learning paths (Cruz, 2019; Jiménez Raya, Lamb, & Vieira, 2007; Ohler, 2013).

CLIL revolves around the idea that it is essential that the practice of a foreign language extends to the study of different areas of knowledge, in this case, environmental studies or "Estudo do Meio".

According to Ellison (2015), such an approach is consistent with the ethos of interdisciplinary and holistic learning, which is at the heart of primary level education, and it is therefore essential that the practice of foreign language extends to other subjects, namely Mathematics and Environmental Studies, reaching for, as Cruz (2019) puts it, "the co-construction of interdisciplinary didactic paths".

CLIL is also now a widespread teaching approach in which a foreign language (FL) is used to teach a nonlanguage subject (Georgiuou.2012).

European institutions have recognized this important approach to their vision and objectives in relation to foreign language learning. The "Content and Language Integrated Learning (CLIL) at School in Europe" (Eurydice.2006) clearly shows how important this approach is and what its benefits are:

> By means of this kind of educational provision, pupils learn school subjects in the curriculum while at the same time exercising and improving their language skills. Subjects and languages are combined to offer them a better preparation for life in Europe, in which mobility is becoming increasingly more widespread and should be within reach of everyone.

It differs from the traditional English as a foreign language (EFL) approach in its dual focus on language and content (Thompson & Sylvén.2015). That is, while in EFL the focus is on language itself, CLIL aims to acquire subject knowledge and competences as well as FL competencies, giving equal importance to both (Georgiou.2012). This, alongside teaching for values, was the main objective of my didactic intervention; allowing for

language to be acquired, used naturally as a vehicle to interconnect pieces of knowledge from both English and environmental studies.

As mentioned, a CLIL approach allows for language learning through acquisition; where it is possible to incorporate the L1 whenever necessary.

Figure 9 shows the processes of language learning, of, to and through. The language of learning is entirely linked to the content of the curriculum area. The language for learning supports the learning process, which is necessary to discuss topics, analyze and synthesize content and use concepts. Language through learning is one that students use to express their own opinion and create new meanings.

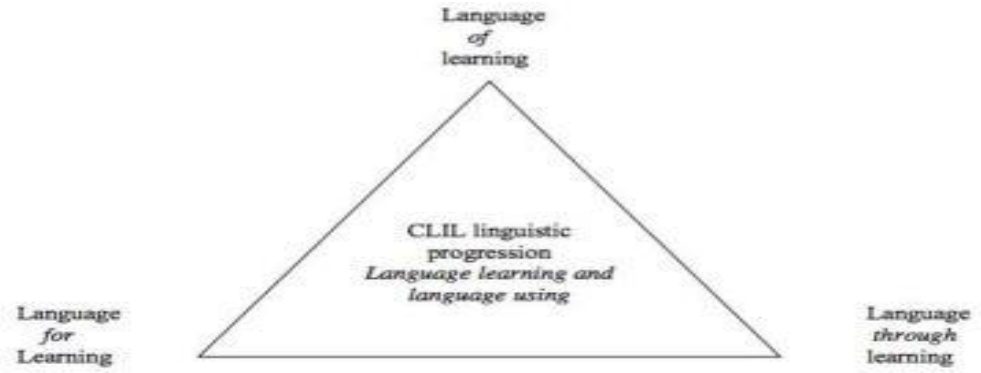

Ilustração 9-The language Triptych(Coyle et al.2010

According to (Coyle et al., 2010; Mehisto, Marsh, & Frigols, 2008), when preparing a CLIL class, teachers should consider four major components; content, communication, culture, and cognition.

Regarding the first component, content, it is necessary to consider the national curriculum regulations regarding Environmental studies as well as the students previous acquired knowledge on certain topics.

In the Portuguese national curriculum for environmental studies, we find present an entire section dedicated to the "natural environment discovery".

In it, and regarding 4th grade education, we find that the following areas of knowledge are to be tackled:

1. Environmental quality (pg. 130)
   - The quality of the near environment:
   - - Identify and observe some factors that contribute to the degradation of nearby environment (dumpsters, polluting industries, destruction of historical heritage…);
   - - Enumerate possible solutions;
   - - Identify and participate in ways to promote the environment.

1.1 The water quality:

- Recognize some forms of pollution of waterways and oceans (sewers, industrial fluents, black tides…).

And, in the School A (where didactic intervention took place) cluster, the *Plano estratégico para a cidadania* (2019) states that "the school is an important context for the learning and exercise of citizenship, and it is reflected in cross-cutting concerns to society, involving different dimensions of citizenship education, such as: human rights education; environmental education/sustainable development;(pg.2)

The document is organized in main themes, sub-themes, goals, and when certain content should be tackled. The next figure presents some of the content in its Education for a Sustainable Development section:

TEMAS	SUBTEMAS	OBJETIVOS	EPE	1º Ciclo	2º Ciclo		3º Ciclo			Sec. CProf
					5º ano	6º ano	7º ano	8º ano	9º ano	
Água	Utilização da água	Conhecer a utilidade da água para o ser humano.	X	X	X			X	X	X
		Identificar os diferentes tipos de água.	X	X	X			X	X	X
	Poluição da água	Conhecer as principais fontes de poluição da água.	X	X	X			X	X	X
		Identificar as consequências da poluição da água.			X			X	X	X
		Enumerar as medidas de prevenção da poluição da água.			X			X	X	X
	Uso sustentável da água	Identificar as medidas de gestão do consumo de água.						X	X	X
		Reconhecer a importância da gestão sustentável dos recursos hídricos.						X	X	X
Resíduos	Tipos de resíduos: . sólidos . líquidos . gasosos . urbanos . industriais . hospitalares	Identificar os diferentes tipos de resíduos.	X	X				X		X
		Conhecer os efeitos destes no meio ambiente.						X		X
		Compreender as medidas de autoproteção e/ou de mitigação da produção de resíduos.						X		X
	Gestão sustentável de resíduos	Conhecer os comportamentos a adotar na utilização dos recursos para evitar a produção de resíduos.						X		X
		Distinguir os principais efeitos da acumulação de resíduos no meio ambiente.						X		X
		Compreender a necessidade da reciclagem para a diminuição da produção de resíduos.						X		X
Energia	Gestão sustentável dos recursos energéticos	Conhecer os diferentes tipos de recursos energéticos.					X	X		X
		Conhecer os principais efeitos da exploração destes recursos para o meio ambiente.					X	X		X
		Conhecer os comportamentos a adotar na prevenção dos efeitos da exploração destes recursos para o meio ambiente.					X	X		X
Alterações climáticas	Tipos de poluição Consequências da poluição para o planeta Terra	Compreende o conceito de alterações climáticas.						X	X	X
		Conhece as causas das alterações climáticas.			X			X	X	X
		Enumera as consequências das alterações climáticas para o meio ambiente.			X			X	X	X
		Reconhece a necessidade de prevenir as alterações climáticas para a preservação do equilíbrio do planeta Terra.						X	X	X

Ilustração 10-Content organization. Citizenship Education Strategy plan. School A.2019

The climate change content, according to the school cluster, is of obligatory implementation(pg.9). While during primary school level, students should be able to identify different types of waste residue, as well as different types of water pollution.

Yet questions concerning climate change, in the form of understanding its concept; knowing what triggers it; understanding its consequences; and recognizing the necessity to prevent it from happening, are to be first tackled during the 5th and 6th year of primary education, with some of its content expected to be taught during the 8th and 9th years of basic education.

In conclusion, it was based on the values, competencies, skills, and principles set by the Portuguese normative documents, in conjunction with an intended curriculum flexibility, that through an interdisciplinary, holistic approach to education, triangulated in a theoretical framework, that a group of 23 4th grade primary students was allowed, during 3 classes, to learn about one, if not the most pressing matter in our world.

> Today's young people will be the stewards of our planet in the years to come, and the future of all life depends on them gaining the knowledge, skills, and passion for nature necessary to transform humanity's relationship with the natural world and build a more sustainable future.
>
> WWF. Our planet, their future.2018

3 Design of the study

3.1 Introduction

According to Costa & Baeza (2005, pg. 1-7) "reformers tend to set profiles and goals that students are only responsible for meeting. Consequently, the student, the first cause of the school's existence, ends up feeling, only as the object of successive experimentations; and where the voice and student experience continue to be overshadowed under a representation that encloses an ideology of control and handling, where, in the name of efficiency, the need to achieve school success, the resources and riches of the life histories of each student are ignored. " It also states that "the distance between school culture and youth culture often converts schools into deaf and decontextualized formative spaces, where they do not listen to young people who are their pupils, nor do they consider their historical and social reality. Pedagogical interaction is experienced without considering the student as an autonomous subject [. . .]"

These reflections are currently relevant, and one study that encompassed both Portugal and Chile, where there were common characteristics in the learning process in both countries, namely the weak concern in knowledge and subsequent difficulty in meeting opportunities that aim to provide students with meaningful learning, where pedagogical devices meet previously contextualized needs.

Thus, an attempt to construct a praxis based on a prior contextualization of tacit knowledge about students is fundamental not only for well-founded didactic choices, but also to ensure a positive emotional relationship with the student, because according to Pacheco (2019) "without forming a loving bond, there is no learning"(translated,mine).

Defending praxis in context is then defending a humanist school.

Abraham Maslow (1908-1970), considered the founder of the humanist school, argues that physiological, safety and self-esteem needs are in a priority place in relation to cognitive and aesthetic needs, where a child who does not have his or her self-esteem needs met cannot be available for the necessary cognitive learning.

It is then up to the teacher to create an educational environment in which everyone feels an integral part of the group and deserves respect, so there is a need to understand the person behind the student.

3.2 Description of context and participants

This didactic intervention project was developed in an educational context at the 1st CBE and implemented in a 4th year class in a public primary school in Porto.

In order to characterize this educational context, it was considered the knowledge and analysis of the data contained in the reference regulatory documents, of which I listed the *Projeto educativo 2018-2021(PE)* and *Plano anual de turma 2021-2022(PAT)* to be decisive.

Also, the dialogue with the cooperating teacher proved to be an important source of information collection, one that allowed me to better grasp the individual context of each student, providing a more knowledgeable intervention of the subjects with whom I was confronted.

School A was inaugurated in 1960 consisting of two schools - one female and one male - which later merged into one. Its designation was inspired by the popular name it always had, because it was built on the grounds of a farm.

Its building has two floors, having the first 5 classrooms, an office that functions as a teachers' room and secretarial support and a gym. On the second floor there is preschool education in two classrooms, a resource centre, an office for special education support, and an area that functions as a canteen. Outside the building there is a landscaped space, two uneven playgrounds where children play and where physical activities also take place.

3.3 Socio-economic characterisation

The school is located in the middle of a social habitational centre, in the outskirts of Porto´s city centre, in the parish of Paranhos. This parish has around 46 thousand people (Censos 2021), the largest in population in the entire city of Porto. Contrary to the population decrease in most of Portugal, Paranhos gained around 1500 people when compared to the 2011 Censos. Yet data also indicates that only around 4800 people from age group 0-14 live in Paranhos, the lowest in all age groups compiled in the most recent Censos.

School A has, according to its *PE* (2018-2021) 80 primary school students, where 10 of those are enlisted in special educational programs, saying that regarding the quantity of students with special educational needs, the number is much higher than expected, also mentioning that this may be linked to the school cluster receiving pupils from two institutions of childcare for children and young people at risk. The *PAT* (2021-2022) only mentions that the majority of students come from a medium/low socio-economic environment.

3.4 Class characterization-class 4.ºA

During my internship in School A, I worked with the pupils in class 4A in the academic year 2021/2022. This class is made up of 22 pupils of whom 9 are girls and 13 are boys. They fall between ages 9 and 10.

5 students are identified in the *PAT (2021-2022)* as having "selective measures" in their evaluation process. Most students attend Curriculum Enrichment Activities, which are an asset for their integral training, also notably most live in the school vicinity.

I merely observed (and assisted whenever seen fit) to the first 9 English language classes, from 19-10 to 11-11. This first phase of observation and assistance, proved to be quite helpful, since it allowed me to acquire knowledge about the public with which the project would be developed, forming a bond with the group, and to meet its interests and characteristics, allowing to the development of a work more tailored to the needs of students. This plus the scaffolding questionnaires distributed 1 week before my solo interventions (discussed in chapter 5), put me at ease, greatly contributing, I believe, to increased odds of a successful overall didactic intervention.

These solo interventions started on 16-11, and ended 16-12, a total of 8 back-to-back classes. From those 8 classes, 3 of them (16-11, 18-11, 23-11) were fully dedicated to my action-research project on climate awareness.

Classes took place on Tuesdays(9am) and Thursdays(10am). Each session lasted for 1h.

In general, the classroom was a pleasant and welcoming space. There I could find a small white board to write on, as well has a functioning interactive board and projector coupled with sound columns and a stable Wi-Fi connection.

They were also well lighted, proved to be warm during the coldest months of the year, and possessed a good sound isolation between them, and although small, which does not always facilitate the organization of students in the space when doing group activities, had no negative impact in the outcome of my internship.

Figures below showcase 4A classrooms:

Ilustração 11- 4A Classroom-Front view

Ilustração 12- 4A Classroom-Back view

These pupils were always quite receptive to every proposed task. They were hardworking, genuinely interested and motivated in the teaching-learning process. They were enthusiastic both in solo and group activities.

On a behavioural note, the PT (2021-2022) mentions that it is a class who enjoys their side talk, but overall, all students show an effort towards complying with the rules inside and outside the classroom. In the 8 lectured classes I found very little friction between students.

4 Part 2-Methodology

4.1 Introduction

In this chapter we are going to look at how, particularly the second aim of this research project, was accomplished; what tools and methodologies were used during my didactic interventions.

The educational practice is inherent to the notion of reflexive practice, since during the educational action the teacher is faced with problems, questions, and uncertainties and, thus, points on which he needs to reflect. In this sense, and in a logic of the professor as a researcher (Latorre, 2003), there is a need for a methodology capable of providing a more proficient praxis.

Fino (2010) states that an innovative praxis "implies qualitative changes in pedagogical practices and these changes always involve a critical, explicit or implicit position, in view of traditional pedagogical practices" (p. 277).

The action investigation, by its most interventional and transformative aspect, has at its core the intention of change. It is essentially based on the reflection of behaviours and attitudes observed in the course of pedagogical action and dealing with concrete problems located in the immediate situation. " (Sousa, 2005).

This process contradicts the positivist concept and technical rationality, focusing on the sociocritical paradigm, due to greater proximity to the “real”, a valorisation of praxis and the reflection inherent to it.

It will then be mainly through an interpretative paradigm. using a mixed methodology that this research will be based, since it takes place in a natural environment, with the students, where field notes and general feedback observation will be collected allowing me to interpret results.

Still, the report will have some descriptive or positivist character. It was used, in a first phase of my research project a diagnostic questionnaire (see section 5.1) with a mix of statistical and interpretative data.

Also, at the beginning of the first class, an informal assessment sheet (see section 5.2) was handed out. This worksheet contained 7 open ended questions which students had the 3 classes to complete and then deliver back. At the end of the project, after the 3 lessons on climate awareness were then finished, the worksheets were collected, and their data also put into perspective.

Overall, that investigation and reflection should be present in practice, and not only in theory, since it greatly contributes to a healthy development by the educator, who will, as investigator of his own practice, understand needed strategies to surpass obstacles that may appear along a career, in a logic of a qualitative evolution that hopefully spills into a change of praxis.

4.1.1 Science communication

One definition of science communication is an activity that "aims to enhance public scientific awareness, understanding, literacy, and culture by building A.E.I.O.U responses in its participants. (Burns, O'Connor and Stocklmayer.2003)

A.E.I.O.U stands for Awareness, Enjoyment, Interest, Opinion-forming, Understanding.

My didactic intervention aimed to increase awareness and understanding on the subject of climate change and its different phenomena. This project aimed for science to be more interesting by being more enjoyable, a methodology that worked hand-in-hand with methodologies proved to be successful in an English class, ultimately improving the student's capability to form an opinion on the social and ethical side of climate change.

Still, there is yet another related concept that is key to what extent this project could me made successful, and that is the notion of the public "science capital". This science capital refers to "science related qualifications, understanding, knowledge (about science and how it works), interest and social contracts" (ASPIRES.2013)

Science capital can be obtained through various forms; formal qualifications, knowing somebody who works in a certain industry and learning about a subject that way; but most importantly for this project, it can be achieved by being interested in science, hopefully leading to autonomous research outside the classroom setting.

Due to my set of students being in possession of a low science capital but showing a great interest in increasing it (as shown in section 5.1), classes were tailored to be as engaging and enjoyable as possible, so that science communication could be effective. Doing so would hopefully lead students to feel compelled to do further research on the topic in their spare time and discuss what they have learned with their peers, increasing their science capital.

How are these concepts then linked in practice? My personal philosophy for producing science communication is as follows:

1- Picking a learning objective: How do I want my audience`s science capital to have changed by the time I was finished with the 3 set of classes on climate awareness?
2- Picking an initial level of science capital: Who is my audience? Am I aiming for people who are already interested in a topic or people who I would like to interest in a topic?
3- Picking a medium: Choosing a format, linked to picking a resource, and style(didactics) that maximizes the probability of my chosen audience reaching my chosen learning objective.

Once this concept of what my project actually is about was clear, it was then a matter of communicating ideas to an audience, again, in the most engaging way possible.

Ultimately this is a question of seeing education as storytelling. This is what was sought during my didactic interventions.

4.1.2 Communicating climate change to children

During the handing out of the diagnostic questionnaires, one student mentioned he/she already had had nightmares about the subject of CC. A response like this one or similar is a warning sign, it should be anticipated, and dealt with carefully, especially when dealing with a younger audience. The feeling one student verbalized could easily be shared among many other students.

It is with this in mind that an educator who seeks to tackle CC with primary school students must tread carefully, being extra careful in its interventions, in an attempt to keep the subject interesting, while showing a sense of urgency coupled with a sense of hope. This is not an easy task, but one that deserved the uttermost attention and reference during my project.

Kristjánsson (2000) mentions that the regulation of these emotions takes place in social interaction in the classroom, or in other learning situations in more informal settings, where teachers and educators play an important role. According to the author, teachers are role models for their students when it comes to emotions, and the sometimes thin line between fear and hope brought up by the subject can become a challenge, with results/feedback varying with each different set of students.

Still, in every case scenario, the use of hope when tackling climate change, especially with primary level students who may find this to be their first contact with the subject, connected to their less developed emotional response system when compared to older students must be a subject of great importance and consideration understood by educators.

Indeed, the theme of urgency raised questions about the fear messages children may be exposed to. Communicating climate change has been criticized for generating fear, which has been found to be an ineffective approach (Reser & Bradley, 2017). A sense of urgency is closely aligned with other emotional responses including sadness and fear, which are likely to arise without intentional fear appeals, so purposefully eliciting fear may be unproductive (Reser & Bradley, 2017).

There is then a need for educators to be aware that anxiety/worry is often evoked when teaching students about climate change.

Collectively, instilling a sense of urgency through fear appeals demonstrates a need to advance literature for children that communicates urgency while acknowledging and managing the already existing fear response to climate change education.

Ojala (2016) argues for the need to focus on a “critical hope that is based in an acknowledgment of the negative, a positive view of preferable futures, the possibility of societal change, and that is related to concrete pathways towards a preferable future” (pg.42).

Snyder, Rand, & Sigmon (2001) mention that in psychology, hope is often seen as a cognitive-emotional concept in which positive views of the future, or visions of preferable futures, are seen as being within reach. This hope ends up being associated to a sense of concern, as both emotions are linked with uncertainty. “To hope for something is also to fear that this something will not come true” (Fredlund.2005.pg.342).

In relation to global environmental problems, Ojala (2007, 2008) has argued and shown through empirical studies with young people, that it is rather the dialectical relation between hope and worry that motivates pro-environmental actions (Ojala.2016), with other studies (Yang & Kahlor, 2012; Verplanken & Roy, 2013) showing that climate worry is related to an inclination to search for more information about the problem, ultimately leading to a potential increase of the aforementioned student´s science capital.

Besides its role in encouraging discussion, Ojala, Verplanken & Roy (2013) seem to argue that worry is a rational response to important values that are threatened by climate change, importantly adding that if those worries are verbalized in learning situations, it could help people do something realistic about the problem at hand.

In this view, worry/anxiety can turn out to be a decisive first step in any attempt to break from unsustainable behaviours and practises, or in striving to become active in a society that pushes climate change movements ever-forward into political agendas.

Still, Ojala (2013) argues that one should not be naïve; worry/anxiety are hard to face, and whether they will help, or reverse transformative learning may have to do with how these emotions are coped with and regulated at an individual level.

As Wals (2007, 2010) reasons, dissonance is vital for transformative learning concerning environmental and sustainability issues, but too much dissonance could be harmful, so the educator needs to be aware of people’s comfort zones when it comes to dissonance.

This all narrows down to the fact that how educators prepare in advance and react to their student´s emotional displays, I argue, is detrimental to student´s coping with the subject, enhancing or hindering the learning process. This puts an emphasis on the importance of being holistically prepared and sensible when covering a topic like CC at a primary school level.

I also argue that conveyed hope can make or break further interest in the matter. A constructive hope that can give students the strength to confront and do something about the problem at hand, a way of thinking inspired by Viktor Frankl, who in is work *Man´s search for meaning* (1946) showed that a sense of meaning can help people bear and confront hardships in life.

4.2 Description of project sessions

The educational intervention project presented below had as constant concern the need for logical and fluid chaining of the sessions, since the scarcity of time necessarily implied a harmonization of pedagogical-didactic strategies and actions that allowed students, in an intervention so limited in terms of time, to achieve the objectives proposed within the curriculum.

Classes went through a full didactic unit, provided for the planning of the head teacher and according to the manual adopted "Let's Rock 4" (Porto Editora): Unit 1 “Let´s protect the planet”. My intervention covered the entire unit, starting with the first 3 classes related to climate awareness, closely related to my project, and following through with subjects such as “Telling time”, “Numbers 1 to 100”, “Places in school” and “Thanksgiving”.

Students were evaluated at the end of the semester through a formal written test. The revision worksheet on these topics, as well as the production, grading, delivery, and correction of both of these documents was conceived by internees, each responsible for their own class in different schools. This responsibility was given by the head teacher, and therefore this work was made in a collaborative way, with my internship colleagues and internship coordinator.

The entire handling of this evaluation process was a first for me personally; this process undoubtably allowed me to grow as a teacher in a way that I was not prepared for at the beginning of my internship. I am now capable of reflecting on the risk taken by my internship coordinator, and I´m thankful for the responsibility given to me, ultimately letting me do more than what I expected during this Internship.

Still, concerning this action-research project, the first 3 classes on Unit 1 “Lets protect the planet” are the ones which will be focused hereafter. As mentioned in chapter 1, the fluidity and pertinence of this set of classes was assured, in the particular context of the annual curriculum and programmed formal evaluation, by the integration of these project driven classes into the lecturing of “Let´s Rock 4” (Porto Editora) Unit 1 which in itself contained environment driven themes.

4.2.1 Session 1

Session 1 took place on 16-11, it was the first solo lecture I´ve had with this particular class.

The aim of this class was to build a fundamental knowledge base on climate change. This knowledge would then be used and further expanded during the following sessions.

I felt at the time and still feel now, four months after the lecture, that this introductory class had the potential to make or break the rest of the projected sessions.

This feeling arose since this was not only an introductory class on a subject almost 40% (see chapter 5.1.2) of the class had never heard of, on a theme not easily conveyed; it was also an introductory class of myself as a head teacher. Nobody has a second chance to make a good first impression, and if friction towards the teacher is in the same way friction towards the subject, then I felt like I had in this class the added responsibility to show who I would be, as a teacher, during the rest of the internship.

Class started by greeting students 1 by 1 who were starting to arrive at the classroom, this was done with the use of a "Social distancing greetings tab" shown below:

Ilustração 13-Social distancing greetings tab

It is useful to keep in mind that this internship took place during a Covid-19 pandemic, and protective measures against the spread of the disease were still in place. This tab was made by the head teacher and adopted by internees as a method of greeting students at the beginning of each class. Students would pick one way of greeting the teacher and proceed to their take their seat.

After students were seated, they were handed out the assessment/work sheet (see chapter 5.2), its purpose was explained and after a short moment all guidance on that subject was completed.

Then, as an introduction to the theme of climate change, students were asked to recall the questionnaire (see chapter 5.1) they filled in the week before. It was asked if they remembered what that questionnaire was about. After students giving their answers, I showcased to them, that in my questionnaire, from the 22 students who took it, 19 said they wanted to learn more about climate change, and that therefore, starting today, and during the next three classes, that will exactly be the topic of our classes.

The feedback students provided was phenomenal and set the tone for the rest of the class.

This build-up was important since it made clear that everyone was excited to start the class.

After that, students were asked to write the date, lesson number and summary. The summary for this class simply read “Climate change”. Also three rhetorical questions were written on the board: (What is it? / Is it bad?/ Why does it happen?). These served as guidance for student´s learning outcomes objectified in this class.

It was during this phase that a resource that proved to be quite helpful was introduced; A “time-bomb” was projected to the class, counting down the few minute’s students had to pass the summary, date, and lesson number. This gamification of a normally uninspired process of every class was accepted to a great extent. Students negotiated how much time they thought they would need to pass everything and raced among each other to complete the task before the time-bomb “exploded”. This idea “spilled” to every class in every other school I was lecturing to a great reception and usefulness as well, to a point where I consider it to be now a staple methodology in any future lectures as a teacher.

The idea came up from reflecting on how much effort was made and time was “lost” during this single routine in many other lessons and different classes I assisted before my solo interventions. In an extreme case, an entire 1-hour class had to be dedicated almost in its entirety just for some students to pass the summary.

It is also important to notice that the last ten seconds of the timer were counted, out loud and in English, by the entire class, allowing them to practice numbers 1 to 10 at the beginning of every class.

The following figure shows a part of the class where this resource was being used:

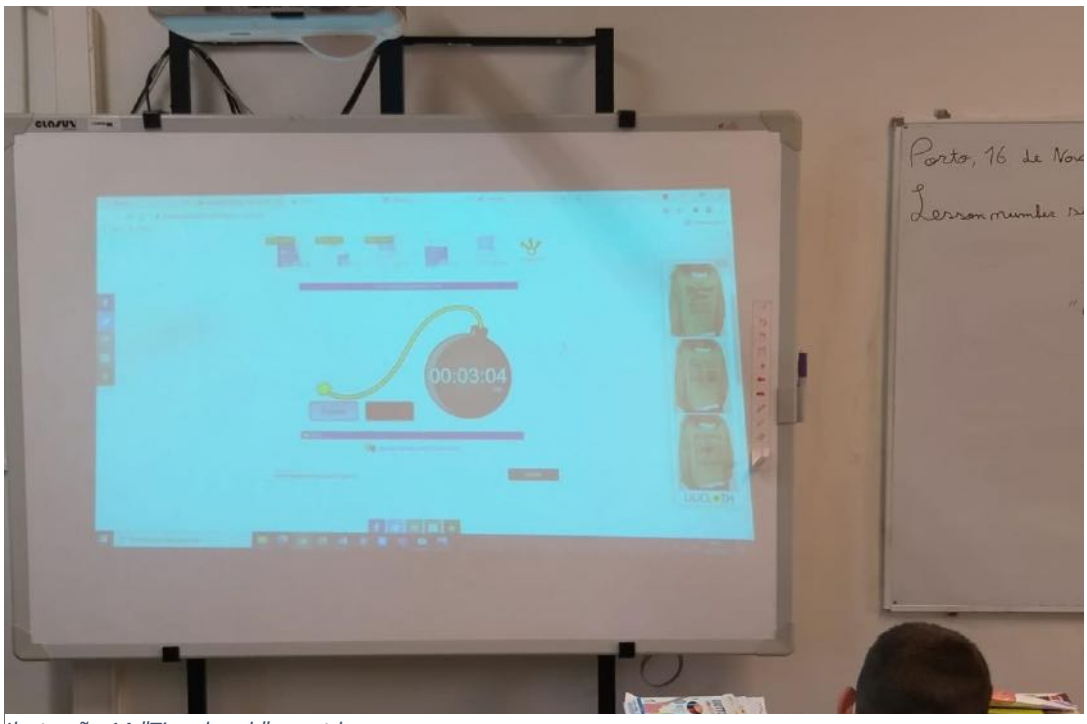

Ilustração 14-"Time-bomb" countdown

After this, and with around 45 minutes left from the class, the following image was projected:

Ilustração 15- Planet Earth

It was then intended to start the first point of discussion and reflection with students. They tried to identify what is in the image, discussed how they felt about it, what feelings awaken in them. The ultimate objective of this exercise was to guide students to reflect that the planet is small, fragile, and must be protected.

Following that we watched the video *The world´s greatest lesson* until minute 1:59, stopping the video with the word "weather".

There was then a second moment of discussion about the overall message of the video, and introduction of the important difference between "weather" (where we reviewed some vocabulary already acquired on this topic) and "climate".

Students being able to differentiate between these two concepts was a major objective for this class, one that assessing by some results in the assessment sheet (see 5.2) was accomplished. In this part of the class, two columns were drawn on the whiteboard, one column with the heading "weather" and the other with the heading "climate". Under these headings were written some words easily differentiating both concepts. Students were asked to recall which weather elements they recalled, and we jointly wrote words like stormy, rain, windy, sunny, etc. Then under "climate", students were asked to raise their hand and say one word that they associated with climate. In this process, 3 words were taken advantage of, "green-house gases", global-warming" and "renewable energy".

During this exercise, an effort to assert to students that weather represented something temporary, that passed by and was inconsistent, in contrary to climate, that was constant and took many years to manifest and ended up influencing that same weather,

in different ways around the world was made. This was also written, in a simpler way, in the two columns. Students were asked to write down these two columns to their notebook.

After that, I asked students something along the lines of "It´s really cold today in Porto, and we´re here talking about global warming and climate change, are we sure that's really happening?". This question already put to test their knowledge about something temporary (cold day) in contrast to something much broader and intangible (climate). Most students quickly jumped to say that this one cold rainy day had nothing to do with the overall climate of our world. This quick reflective mindset showed to me that students were in fact attentive and grasping what was being presented so far to them.

Still, in order to further distance the class from seeing climate change as an abstract and far away concept, and to consolidate that climate change is really happening (despite the cold), the joint visualization of 2 quick timelapses was made.

One of them was *Global warming 1800-2020*, showing under 30 seconds the evolution of the worlds mean temperature levels on a dynamic and easy to understand world heat-map.

The second timelapse, *Ice-melt 1985-2020* shows one of the most known effects of climate change, polar circle ice melt. In this timelapse students saw thousands of tons of rock-solid ice melting away in a few years in British Colombia glaciers, disappearing into the Pacific Ocean.

With about 25 minutes left of the class, and since on the previous videos we touched on some consequences of climate change, the following image was projected, in order to further advance into the next topic of discussion, causes and consequences of climate change:

Ilustração 16- Climate change poster

The part of the consequences was only touched on lightly, because of their nature considering the age of the pupils, and for reasons discussed in more detail in section 4.1.2 it was not meant to be the focus of the class.

Here, the use of analogies and comparisons was of great use when trying to simplify some of the presented concepts. In fact, the use of analogies to simplify what, at first sight, is a dauting task to simplify, is in my view crucial for a successful learning process.

The "causes" part of this image was also only slightly touched, mainly because of their close connection to the theme of "pollution", intended to be more thoroughly discussed in the next session. Still, the concept of "greenhouse gases", still written on the whiteboard was discussed per request of a student, where through the use of a "blanket" analogy it was explained that polluting the planet was like layering blankets on top of the planet, and that these blankets were suffocating our earth, making it feverish and too warm, and so we needed to start pulling some of those blankets in an effort to cool it back down.

Also during this part of the class, one student mentioned the importance of renewable energies, a concept also still written on the whiteboard, to cool the earth, these concepts of renewable energies were, again, not planned to be already implemented in this particular lesson, but I was able to notice the interest students had towards this topic and decided I could spare some time to show one video saved for next class *The origins of energy in 1 minute*. In retrospection it was a good decision to already talk about these concepts and take students doubts about them; I feel like the interest and therefore opportunity to develop them came by naturally and should for that reason be tackled right there and then. It gave a sense of cohesion to the entire lesson.

In the last 15 minutes of the class, students played a *Climate change Kahoot* tailored by me, consisting of points discussed during the lesson, focusing on the objectivized learning outcomes. Here the questions were projected, and a democratic voting system was implemented, where the most voted answer would be selected as an overall class answer.

This gamification methodology was again greatly accepted. Students were quite receptive to it, competitive, and showed to have obtained the objectivized learning outcomes for this lesson by getting right every question on the Kahoot. The use of this resource proved to be an exceptional way to easily time-manage the last moments of the class: Pacing the exercise accordingly allowed me to end the Kahoot just as the bell rang for the next class.

In a final note, students' receptivity to the theme was well beyond my best expectations, and in a class where spoken discussion of the different topics was nuclear and an intended methodology to further advance through the lesson, pupils showed to be participative and collaborative the entire lesson.

4.2.2 Session 2

During the first lesson it was sought for students to be able to answer "Climate change - what is it? Why should we talk about it? Why does it happen?".

Now that the foundation of this subject was implemented, this time the focus of the class was to answer the question “what can we do?” when it comes to contributing to the health of our planet.

The class started with greeting students the same way that happened on the first lesson; students took their seats and passed the summary “Climate change: What can we do?” using again the “time-bomb” that proved to be quite successful in the first lesson.

After, students were asked to give me a brief overview on what was discussed last class, in session 1, remembering that way some concepts that would be brought up again in this lesson.

In the first part of the lesson students visualized a story *The tantrum that saved the world*. I´ve chosen to tell this story since it fits perfectly in the theme of the lesson; it was introduced by saying something along the lines of “There´s somebody I want you to meet, and who apparently has a big problem at hand, and doesn’t really know how to deal with climate change it seems…”

This took us on a journey of activism, allowing us to start answering the initial question, present in the summary, and that guided the entire lesson.

The story was told in English in its entirety, took about 10minutes to complete. At the end of the story and in a natural fashion, came up the question “what is activism?” This question lead into the next part of the lesson, where thanks to this resource *Young activists around the world*, a world map showing in a dynamic way many children and young adult activists, who in their own country and using resources at hand fought for a better planet, pupils saw that ultimately there was something everyone could do, and responsibility lay in everyone’s hand no matter the age.

From this reflection, I made a reference that everyone can contribute, no matter how small that contribution may seem, and that we would now learn what exactly we can do, in our everyday lives, to become small activists. We did so by proceeding into the next story, *Planet rescue* (2019).

This book was kindly borrowed from my internship school coordinator, and depicted in an interesting and unique way, activities like closing the tap, turning off the lights, using public transports, eating less meat, while also making a reference to overall healthier lifestyles.

The following figure depicts a moment when the story was being told:

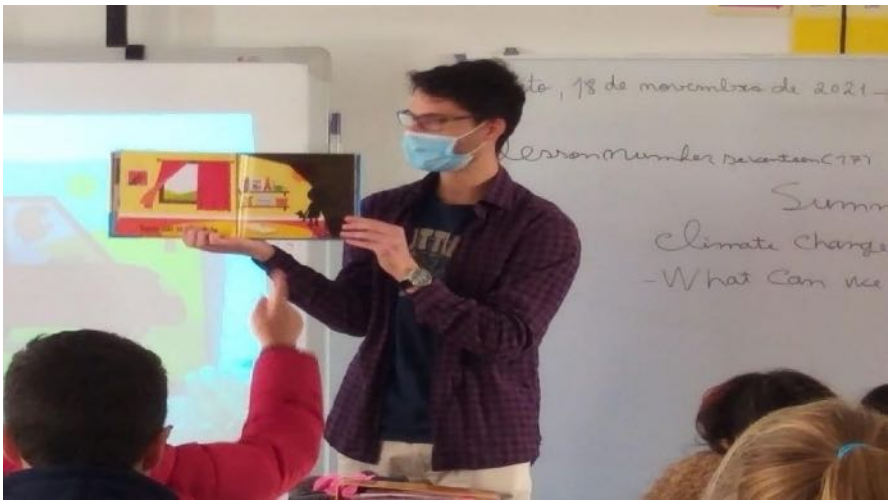

Ilustração 17-Reading of "Planet rescue"

From the many small, feasible actions present in this book, recycling and its importance was highlighted. Recycling vocabulary and activities related to it were one of the main subjects planned to be formally evaluated, in the form of a written test at the end of the semester. Also, in the “save the bees” section of the book, I mentioned that a small animal is one of the most important in our world, and that in the next class they would find why.

The final 15 minutes of the class were dedicated to expanding this knowledge about recycling by playing a “Recycling game.” Here each student takes turns to the pre-attached containers at the back of the room, choosing which item belongs to each container.

Ilustração 18-Recycling game

Immediately after each student posted their item in the container, they were given a soup letter about recycling and climate change. This was implemented since in other classes in which the same activity was done, the problem arose that when students finished choosing their item and returned to their place, they were easily distracted, disturbing those who still needed to participate on the activity.

The lesson finished calmly with pupils seated finishing their soup letter activity.

4.2.3 Session 3

This was the last lesson with this class dedicated to environmental awareness. In this class the objective is for students to realize that in nature everything is connected in some way, and that even the smallest action has consequences

After the initial greetings, students passed the summary that read" Our relationship with nature".

After a brief recap of what they´ve learned last session, students were reminded that in session 2 we questioned why bees are one of the most important animals in our ecosystem. In this class we intend to answer that, bringing us to the main points of the lesson: interdependency and the importance of biodiversity.

Firstly, the following image was projected and reflected upon:

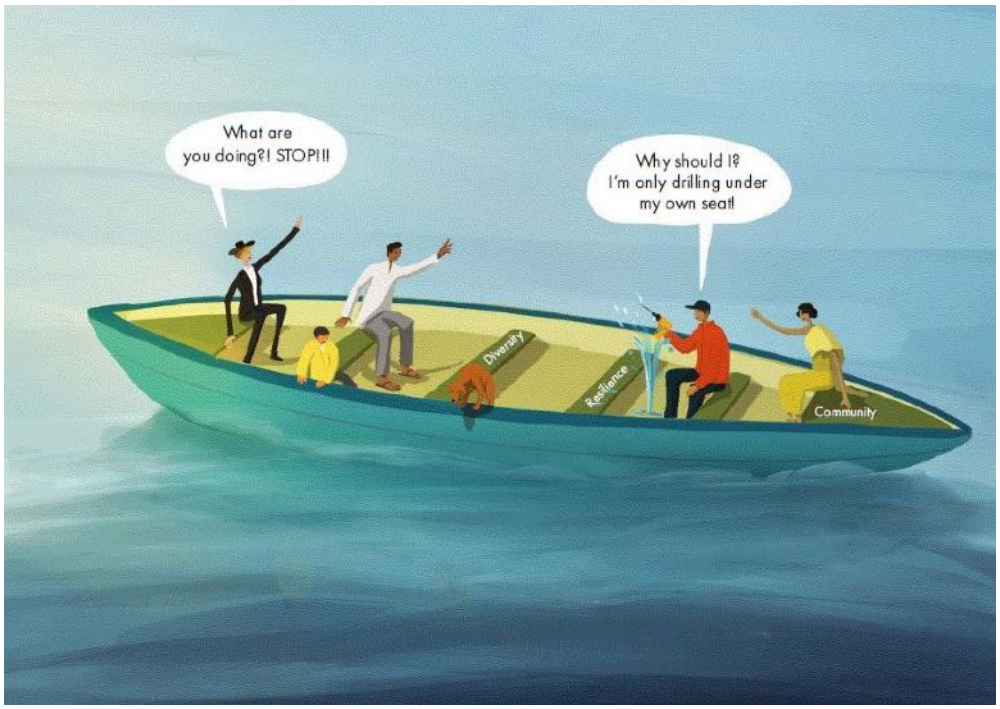

Ilustração 19-Interdependency cartoon

Pupils were then asked to describe what they were observing; what is happening in the picture; what message the cartoon is trying to convey, and what they thought would be a good title for this cartoon.

This first reflective activity served to ease students into the concepts explored during this lesson, the exploration of interdependency and biodiversity. This and other discussions present throughout this set of classes were always encouraged to take place in English.

Right after this first joint activity, students were shown a short video, "Biodiversity" (2019). The discussion of the video intended to lead students to realize how important our role and our actions are when it comes to protecting our planet. Something that

they were already made aware from the last 2 lessons, but it is never enough to remember.

The video covered key concepts for this lesson, habitats, and ecosystems, all in an effort to start showing pupils that our species depends heavily on the safety and well-being of other species do thrive. It also makes reference to concepts tackled in the last 2 lessons.

It hinted students towards the importance of bees and other pollinisers to keep the food they eat in supply, it showed the role wild plants deep in jungles have in making our medicine, among other benefits.

Importantly, the last half of the video references climate change and its challenge to biodiversity and natural order. Ultimately this managed to link and tie together concepts studied during different stages of all lessons together, in a seamless and coherent manner.

After the video, and with around 30 minutes left, began the second part of the lesson; a read-aloud of the "Because of an acorn" (2016) picturebook.

This story aimed to consolidate, in a more visual and interactive way, the main message of the lesson. Through it it´s possible to see the chain of events and consequences that lead us from a simple acorn, to an entire forest.

Firstly, pupils were shown the name of the story and each one was shown an acorn, allowing them to imagine and take a guess regarding what the story would be about. Then throughout the story, students were given space to predict the next step in the chain of events, all while consolidating their English vocabulary.

After the read-aloud came a joint exercise that consisted in constructing a timeline based on the events that took place in the story. This was done with use of flashcards, where students helped to identify the sequence of events until they formed a complete cycle, where they went ahead and glued the correct flashcard on the whiteboard.

The following figure represents the completed cycle made by students:

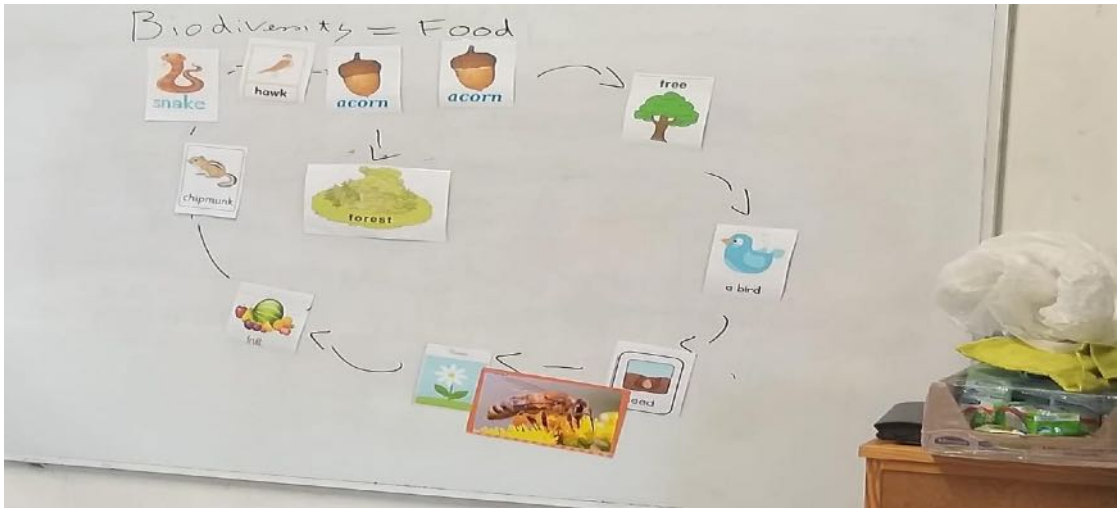

Ilustração 20-"Because of an acorn" timeline exercise

The final portion of the lesson consisted once more of a calmer exercise aimed at blowing off some steam built up from the previous exercise. Here a worksheet was distributed, where students had to enumerate the sequence of events from the story, while also colouring the “characters” of the story.

The following figure show pupils completing the worksheet:

Ilustração 21-"Because of an acorn" worksheet

To end the lesson, the worksheet was corrected in group, namely the correct order of events on the timeline. As a bonus, every student was given a real acorn, as a souvenir from their 3 lessons on climate awareness, and under the promise that they would go ahead and plant it, trying to take care of their own tree.

On the following students break I could see they were already planting their acorn on the school yard.

Thus ended the 3 lessons on climate change/awareness with this 4th grade class.

5 Analyses and discussion of data

5.1 Questionnaires

The main role of the questionnaires was to perceive the seriousness of climate change felt by students, and how in dept, if at all, they knew about the phenomenon, in an attempt to scaffold their existing knowledge, bridging that knowledge into my didactic interventions that would follow the weeks after, ultimately allowing me to better plan and prepare for expected public acceptance on the subject.

Indeed, scaffolding is here being conceptualized as the ability to foster what students already know, using planning, resources, methodologies, in order to achieve goals, present in the lesson plan. It can be further explained as a process that enables the teacher to give constant context related to the main idea of the class.

Some of the example questions were taken and adapted from the Special Eurobarometer on climate change (2021), (some of its data already put to context in section 2.4.1) a comprehensive study made by the European union on its 27 members to better understand how European citizens perceive climate change, focusing on understanding how serious the sample (26,669) considers the problem to be; personal steps taken to help tackle the problem, among other questions supporting the EU goal to be climate-neutral by 2050.

The questionnaires were handed out to every 4th class student in 3 different schools, all belonging to the same school cluster where my internship took place.

Questionnaires were handed out at the beginning of the class, and since they were short and concise, with an effort to employ simple to understand vocabulary and concepts (6 close ended questions), took only around 10minutes for everyone, on any given class to complete them. No help was given during its completion, in fact a great majority of students did not require it since the entire questionnaire was in Portuguese. Questionnaires were collected shortly after being handed out.

Before starting the questionnaires, students were made aware that:

1) This was by no means a test or any sort of evaluation moment in their English class, but only an autonomous survey made by me.
2) There are no wrong answers, and every answer would fall in total anonymity (no name required on the questionnaire).
3) Class 4A in school A, where my didactic intervention happened, was not aware that in the following weeks they would tackle the subject present in the questionnaire; also not being aware that I would be making any solo interventions on any sort of subject during my internship there.

These steps were made in a way to better guarantee honest, and un-biased answers, important for quality data control. A sample size of 60 questionnaires was gathered.

In the next sub-chapters, statistical results from the questionnaires will be presented, followed by a contextualization of those same results.

5.1.1 Questionnaire results

Question 1)

1) Já ouviste falar das "Alterações climáticas" ou do "Aquecimento global"?

a)Sim. ☐ b) Não. ☐ Outra resposta:_____

Global results:

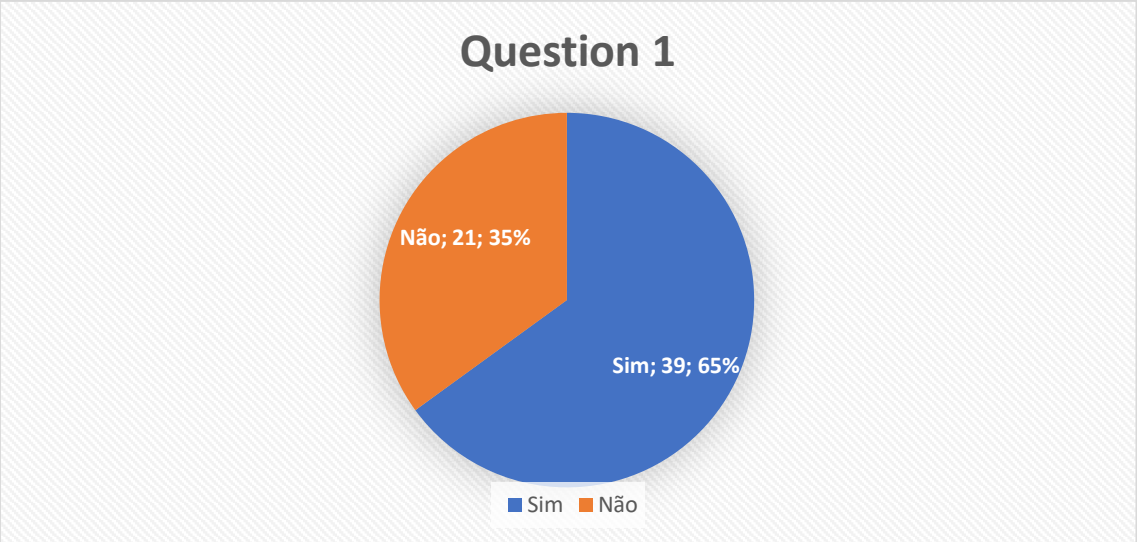

Ilustração 22- Question 1 results

Question 2)

2) De 1 (nada importante) a 10 (muito importante), quão importante achas que é aprender sobre isso na escola? Faz um círculo na tua opção.

1 2 3 4 5 6 7 8 9 10

Global results:

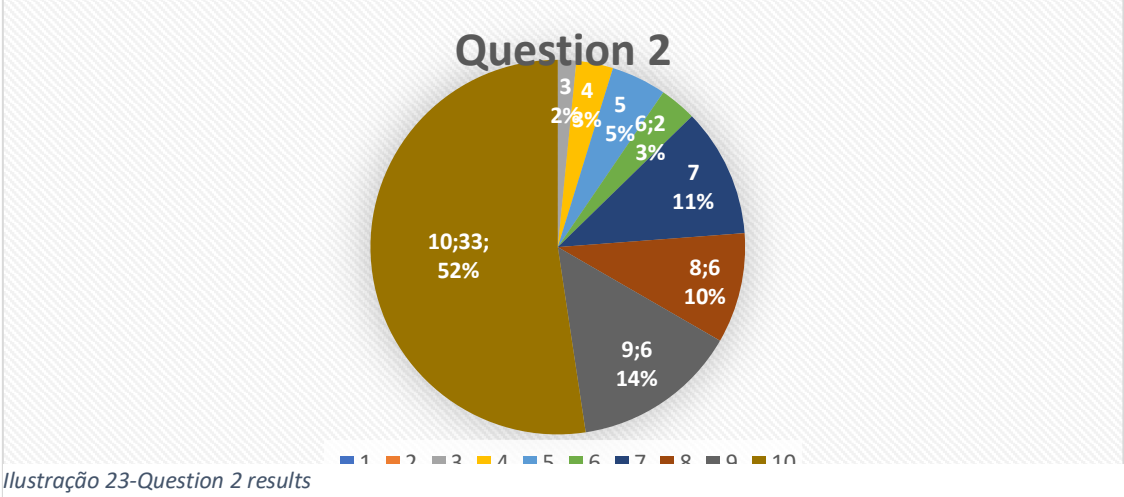

Ilustração 23-Question 2 results

Question 3)

3) Assumindo que as alterações climáticas estão a acontecer, quem/o quê achas que as estão a causar:

a) Atividades naturais. ☐ b) Atividades humanas. ☐

c)Não sei. ☐ d)Outras (Quais?):_____

Global results:

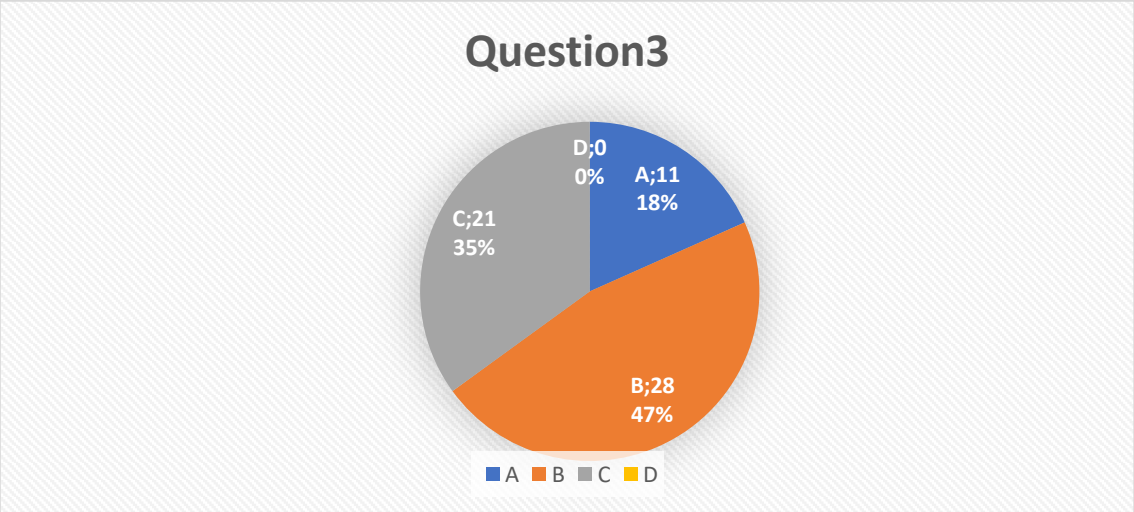

Ilustração 24-Question 3 results

Question 4)

4) Achas que a maioria dos cientistas:

a) Acredita que as alterações climáticas estão a acontecer. ☐

b) Discordam entre eles sobre se as alterações climáticas estão a acontecer. ☐

c)Acreditam que as alterações climáticas **não** estão a acontecer. ☐

d)Não sei. ☐

Global results:

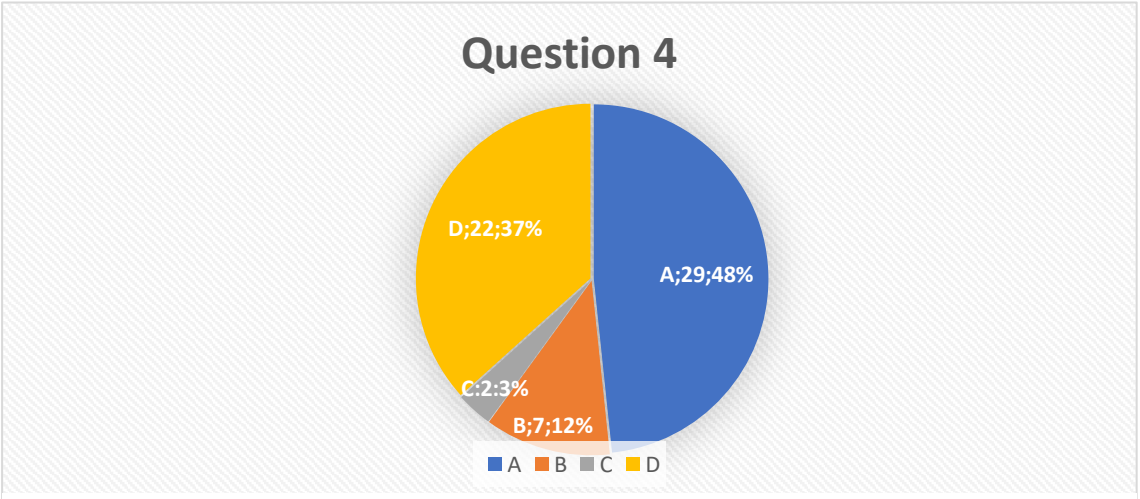

Ilustração 25-Question 4 results

Question 5)

5) Achas que as alterações climáticas conseguem ter um impacto negativo nas plantas e animais do nosso planeta?

a) Não, quase nenhum. ☐ b) Mais ou menos. ☐

c)Sim, têm um grande impacto. ☐ d) Não sei. ☐

Global results:

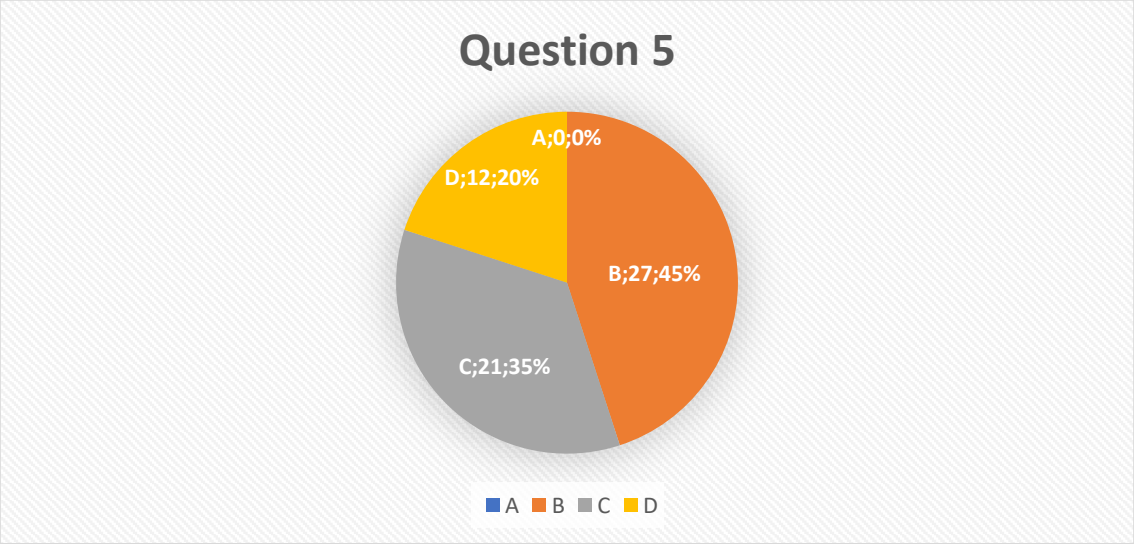

Ilustração 26-Question 5 results

Question 6)

6) Querias/gostavas de saber e falar mais sobre este tema nas aulas/escola?

a) Sim. ☐ b) Não. ☐ Outra resposta: _____

Global results:

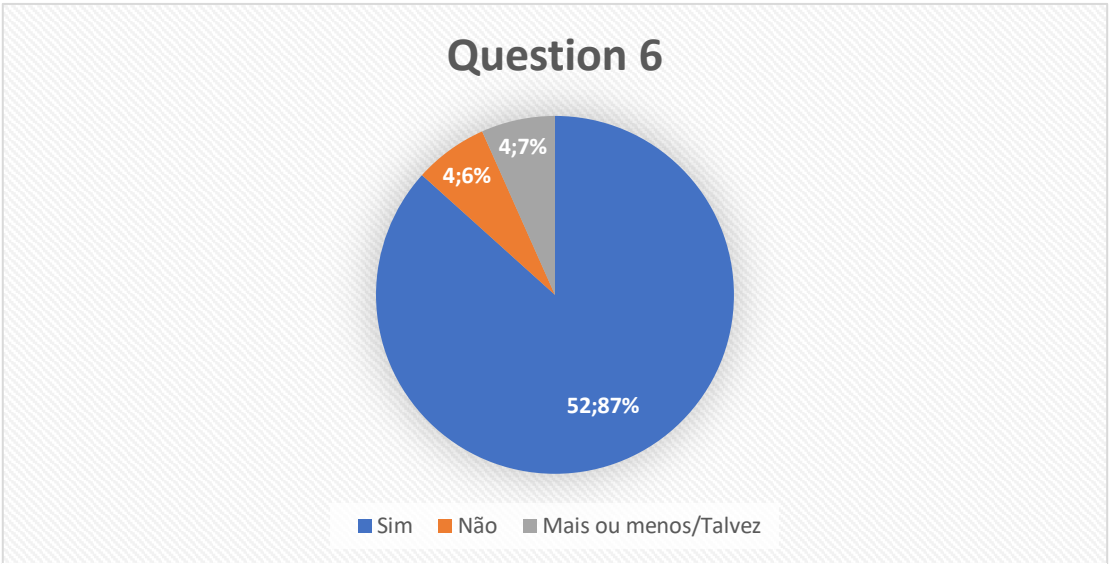

Ilustração 27-Question 6 results

5.1.2 Interpretation of results

A sample of 60 questionnaires, distributed in 3 4th grade classes in 3 different schools will now be analysed. Overall, due to its statistical nature, it is possible at the outset to infer a large share of similar answers in questions 1 and 6, while the other questions present a more divided share of answers among them.

I recall that the main role of this questionnaire was to perceive the depth of seriousness of climate change felt by students, and how in depth, if at all, they knew about the phenomenon, in an attempt to scaffold their existing knowledge in an English class setting.

In this sense, global results will be contrasted with the specific results of the class where my didactic intervention took place, 4th grade of school A

The answer to question 1 (“Have you ever heard about "Climate change" or "Global warming?") reflects this goal, where it turns out that in an overall sample of 60 students, 65% say they already have heard of these terms. In school A class, 68% claim to have heard of the same terms. This answer helped my planning since it allowed me to know in advance that most students had already been exposed to these topics in some way, and that my first lesson, in which the goal was to build a basic knowledge about climate change, would not be done in a total vacuum, thus being able to count on some reflection and comparison of their current knowledge with new knowledge acquired in the subject.

The answer to question 2 ("From 1 (not important) to 10 (very important), how important do you think it is learning about that in school?”), intends, through a broader spectrum, verify the importance given to the theme by the students. Over 50% of the overall sample selected option 10 on the scale, with over 75% of the sample choosing between the top 8-10 values. In school A class, 45% of the students also chose the highest value on the scale when it came to representing the importance of the topic. This question aims to complement the 1st one as a general diagnosis of the students' positioning towards Climate change.

The answer to question 3 ("Assuming climate change is happening, who/what do you think is causing it?") came about because one of the objective topics to be discussed in the first lesson, after the initial introduction of "what is climate change", was also debating "why does it happen". On a global level some differences of opinion are observable. It can be seen that 45% of the sample states that climate change is caused by human activity, the remaining 53% are divided between "Natural activities" and "Don't know". In school A 45% of the students claim not to know the answer, and 40% claim it is due to human activities. In this case, almost half of the class claims not to know what causes climate change, or perhaps does not connect it to anthropogenic reasons. This piece of data allowed me to have special attention regarding this subject during my didactic intervention.

The answer to question 4 ("Do you think most scientists agree/ are not sure/disagree/I don't know that CC is happening?") again connects with question 3, in that it diagnoses the students' positioning this time toward the scientific community. The overall results show that 48% of the sample say that scientists corroborate that CC is happening, with 37% saying they don't know. At school A similar results were obtained, about 45% for line a) and another 45% for line d).

The answer to question 5 ("Do you think CC can have a negative impact on the plants and animals on our planet?") arises since in the first introductory lesson it was planned that the question "why should we care?" would be raised to students; this topic would be pertinent again because it was planned that in the last class on the subject, the importance of biodiversity on our planet would be further discussed. The overall results show some indecision; 45% answered "sort of", 35% answered "yes, it has a big impact", 20% answered they don't know. In this question I point out that none of the students selected the answer "No, almost none". In relation to school A class, I observe similar results; 59% answered "sort of" and 32% replied that "Yes, it has a big impact".

Answer 6 ("Would you like to know and talk more about this topic in class/school?") is one of great importance towards what was one of the objectives of this questionnaire; to try and understand how the topic would be received by students.

Overall, 87% of the sample shows interest in learning more about the subject in a school context. In school A school, 19 students (86%) out of 22 also say they wish to learn more about climate change in a school setting.

The answers to question 2, revealing that the overwhelming majority of students find it important to learn about CC, together with the answers to question 6, where again most students seem to want to learn more about the subject, gave me another insight into the importance, relevance, and above all, acceptance of this project.

Also, thanks to the questionnaire, where for example in answers 3, 4 and 5, many students selected the answer "I don't know", it was revealed that there was room to, in fact, take advantage of the acceptance towards the subject to already, in 1CEB, start teaching these contents normally programmed for later study cycles.

Overall, I think these questionnaires were important and enlightening; both from the perspective of a comprehensive overarching investigation into the topic of teaching about CC in elementary school, while also being relevant to what would become my subsequent classroom practice.

5.2 Assessment sheet

As a method of evaluation on the progress made by students during 3 classes on the subject of climate change, students were handed out, at the beginning of the first class, an assessment sheet. This sheet contained 7 open ended questions, questions were written both in English as in Portuguese, and students had the freedom to write their answers in Portuguese if they preferred to do so.

This assessment sheet covered topics tackled during the 3 classes, with students being asked to, at the beginning of the class, take the sheet out and be attentive on what the teacher was talking about, for at any moment an answer to a question present on the sheet could be brought up. The goal for using this method of assessment was then to allow me to both have a final understanding of student's general grasp on the subject through qualitative analyses, as well as an artificial method that hopefully led students to be on their front-foot during classes, attentive through them, sheet in hand, reflecting if and how any question on the sheet had been answered as the class tackled different subjects.

Students were aware that this assessment sheet did not count to their formal English class evaluation, and that they would have no grades on those sheets, nor would they be returned to them after completion. In fact, evaluation on part of this topic would come during their planned formal written test, as the theme of recycling crossed both my project-class plan (second class, see section 4.2) as well as students curriculum program, undertaken during unit 1 of their class manual "Let´s Rock". This integration of my project into the planned development of the annual curriculum is explained in section 4.2.

These open-ended questions despite not being easily quantifiable and compared as the prognostic questionnaires were, offered students the ability to express their knowledge in a more comprehensive way, also allowing students to practice their English witing skills.

Using this method of evaluation, students were allowed to take the sheet home, relying on them to keep it in their English class portfolio as instructed, bringing it the following class, and deliver the sheet back on a stipulated date. This ultimately proved to be a challenge, as some students did not bring their worksheet into next class, failed to deliver it on the agreed upon date, or failed to deliver the sheet back altogether. In fact, from the 22 handed out sheets, only 10 were managed to be recovered in time of the ending of my internship.

Question 1 asks students about "What is Climate Change?". This topic was covered mainly during the first class, where an approach towards a separation between concepts of weather and climate was aimed. The overall feedback obtained is that students managed to grasp these two concepts, with some students answering " It´s when the weather changes over the years", and others relating weather to global warming and other climate change symptoms.

In question 2 “How do we know it (CC) is happening?”, students mentioned that “because ice melts and sea level rises”, or “due to more occurrent summer floods” or even “ by anomalies such as rising temperatures, floods, droughts”. This shows a tendency for some students to already being able to begin relating events they see around them to a broader spectrum interconnected with climate change.

Question 3 “Who is causing it” aimed to assess students answers of who is responsible for CC. Every answer mentions human activities to be responsible.

Question 4 “What causes it” allows students to further develop their grasp of human influence on CC, narrowing which human activities are detrimental to the planet well-being. Students tend to mention the emission of gases into the atmosphere by factories and cars to be the most detrimental, with littering and deforestation also being mentioned.

Question 5 “Why should we worry” relates back to the first class, where, although it was not the focus of the project, consequences linked to CC were displayed and put into context. Here students mentioned that sea level rising is a threat to coastal cities, because it can “kill many animals, plants and people”, and also “put at risk of extinction many living beings”

Question 6 “What can you do to help our planet” aimed to assess which individual actions students knew could help the environment, many of them tackled in the second session of the project. Here students mentioned riding a bicycle, playing outside, using public transport more often, using renewable energy, not littering, planting trees, properly disposal of waste, wasting less water, among others.

Question 7 “How can it harm animals and plants”, in which students showed a tendency of having successfully acquired the concept of habitat, heavily relating its loss to the extinction of those who live in it, whether animals of plants.

6 Conclusions, limitations, and recommendations

The report has established that climate change knowledge is essential in our globalized world, a problem affecting millions worldwide. This knowledge can come in many ways (see section 4.1.1), with this action-research project showing how primary school students can be introduced to it in a fun, scientific, coherent way by using the appropriate resources and didactics.

As mentioned in the aims section on this report, it was sought to offer here a data-basis of what can be done, and how it can be done when presenting the topic to a younger audience. This leads me to believe my first aim, gathering and presenting my findings to others who may be interested in seeking climate justice to have been achieved.

Still, this study and action plan has its limitations. Theoretical guidance for a "fool-proof" way to explain this phenomenon is limited or non-existent, and as such, the ways to convey the urgent issue that is climate change, used is this study, are of an interpretative nature and will always be subject to further analysis, reflection and critique. That was also an aim of this dissertation. The theory, practice in context and reflection displayed throughout this research project are now useful tools to be interpreted and taken advantage of.

The second aim was to be able to give this project an empirical testing ground, that is, being able to create and give lessons on the topic of climate awareness to a 4th grade primary public-school class, while at the same time also being responsible for the completion of a full didactic unit and respective evaluation moments.

This was accomplished by collaborating with my internship coordinator, by focusing on the framework described on Portuguese normative documents, and by being able to introduce the topic during a part of the already planned year curriculum (recycling). This took planning, namely the timing of how many of my lessons could have been dedicated to this topic without jeopardizing other planned curriculum content and activities. In the end, I feel like 3 lessons were enough and did justice to the spotlight this topic deserves. Ultimately it was shown here that with planning, this subject can already be successfully developed in a primary school English class setting.

The first objective mentioned that this action plan sought to be constructed in a way to allow itself to be adapted to a broad range of class configurations and settings, using tools and a language compatible with a comfortable read regardless of the audience previous knowledge on the subject.

This goal was not completely achieved, since although the language of the text, as well as its organization and structure were built keeping in mind its general target audience, the resources used during the classes, although varied, turned out to be too dependent on a video-projector to introduce and discuss certain topics. This was visible especially in the first class, which had a more expository character by nature.

The second objective, being able to investigate through a literature review, the potential adaptability of climate change as theme to be introduced in primary school education in Portugal was accomplished, where it is demonstrated through a broad vision of the subject, at world and European level, and moving towards a closer one, in Portugal, to demonstrate the relevance of having included in the primary cycle objectivized contents related to this problem.

The third objective, guaranteeing that the methodology and resources used during the internship will always try to be in concordance, at their core, about the learning process itself was also accomplished. In fact, many of the resources used during my internship were introduced to me somewhere along the way throughout my master's degree, from the "time-bomb" to the kahoot and others.

Importantly, the use of these resources aimed to make all stages of the lesson exciting. Students learn if they are having fun, and in a recommendation note, in the selection of these resources it is as important to properly simplify and convey the objectivized learning outcome as it is for students to enjoy their time during the lesson. This focus on how science can be effectively communicated and the importance of making it interesting can be further analysed in section 4.1.1.

Another recommendation I´d like to point towards is the importance of using a language of hope when presenting climate change to a young audience, it must transpire and be nuclear throughout any planning on the subject. This notion is also further expanded in section 4.1.2.

One characteristic on the report I would like to mention, and that was my 4th objective (compile and employ data collection tools which will allow for a further discussion and interpretation of results) could have been managed differently. While the questionnaires (section 5.1) were quite useful and were rightly employed, the lack of data presented using the assessment sheet (section 5.2), made me now consider a different approach or resource for gathering the same type of qualitative feedback.

There's another aspect I'd like to reflect about, which is the overall use of English in the classroom. I think I could have used the English language on a more regular basis at certain times. However, I took care to use the English vocabulary and expressions appropriate to the students' level of learning, which represented the content of the lessons, according to the plannings, progressively employing vocabulary and more difficult sentence structures. On the other hand, I believe that at this level of education, the development of discussions around such complex issues inevitably implies that the dialogue between teacher and students is initially established mainly in the mother tongue, progressively giving way to the foreign language.

Also of important notice, while the model of theme development used in this analysis incorporates tools to address reflexivity such as immersing and distancing oneself from the data, my upbringing in Madeira Island, where nature is a central part of everyone´s lives, coupled with my natural tendency towards a humanistic and transformative approach to education, focusing on the emancipation of students from predetermined

ways of thinking and being surely have influenced this analysis. I believe that education, health, and the environment are important interdisciplinary topics that benefit from diverse perspectives and theoretical frameworks.

In the end, this work was the culmination of my efforts towards showing students the importance of the times they are living. It was an exceptionally rewarding experience, filled with great memories and learning outcomes, coupled with a sense of overall accomplishment unrivalled by any other internship or job I may have done to this date.

I hope, that during the reading of this report, I was able to transpire how much the subject and this entire project meant to me at a personal level, hopefully pushing forward the idea that now more than ever, education is the root of all the changes we wish, and must see in our world.

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Annexes

Annex 1: Lesson Plans

<table>
<tr><th colspan="5">Lesson 1
General aim</th></tr>
<tr><td colspan="5">Introduce knowledge and vocabulary related to the “Environment/climate change” topic</td></tr>
<tr><td rowspan="2">Strategies</td><td colspan="3">Theoretical content</td><td>Intercultural domain</td></tr>
<tr><td>Communicative</td><td colspan="2">Lexical/Grammar</td><td rowspan="2">Observing/debating the effects of climate change worldwide.</td></tr>
<tr><td>Understanding very simple sentences and texts while Identifying vocabulary accompanied by images related to the topics.

Being able to say and repeat vocabulary related to the topic.

Fostering of critical thinking capabilities</td><td>Share opinions on certain topics.

Oral production evenly distributed throughout the lesson</td><td>Environment/climate change related vocabulary.

Previously discussed topics (weather, transports, pollution…)</td><td></td></tr>
<tr><td colspan="5">Procedure</td></tr>
<tr><td colspan="5">Write on the whiteboard, before the class begins some key learning objectives students should strive to achieve on the lesson. Climate change: (1-what is it? 2-Is it bad? 3-Why does it happen?). Also make a brief reference to the results obtained in the pre-questionnaires made in the previous week, where 20 out of a possible 22 students answered that they wanted to know more about the proposed themes, and in general give great importance to deepening this topic in the school. (5min)

1-Opening routine-5min
Start by greeting students 1 by 1 who are starting to arrive at the classroom, this was made with the use of a “Social distancing greetings tab(attachment 1).
Students go to their seat and wrote the lesson, date and summary(climate change).This phase of the lesson is done with the presence of the “time-bomb” resource (attachment 2)

2- Warmup/vocabulary activation -10min
Next, an image will be projected (attachment 3), intending to start the first point of discussion and reflection with students. Pupils should try to identify what is in the</td></tr>
</table>

image, how they feel about it, what feelings awaken, this is done in order to guide the students to reflect that the planet is small, fragile, and that it must be protected.

3-Main body- 20-30 minutes

Watching of the video *The world´s greatest lesson* up to the minute 1:59, ending with the word “weather”.

Second moment of discussion about the message of the video in general, and introduction of the important difference between “weather” and “climate. ”

Students are asked to say which weather elements they recalled learning, and wich they associate with climate. This vocabulary should be separated in 2 columns and students should pass it to their notebooks.

After, in order to consolidate the fact that the changes are happening (although it is cold), a preview of 2 short timelapse videos will be made:

Global warming 1800-2020. and Ice melt 1985-2020

4-Review of content- 15min

The last part of the lesson consists of briefly discussing why these changes are happening and their consequences. Vizualization of the poster (attachment 4)

The consequences will only be touched lightly, due to their nature taking into account the age of the students.

Depending on the time available, the final activity may be the read-aloud of a “bridge” story (*The tantrum that saved the world)* between this and next lesson; a distribution of a word search related to the topic(attachment 5); or a Climate change Kahoot

Closing routine-5min

"What did we learn today?" or "what did we do that helps us learn more english?" moment.

Resources	
Computer, video-projector, worksheet, soup letter	
Time	**Type of work**
One 1h session	Single + group
Evaluation	
Continuous + Pupil’s ability to start doing their worksheet related to the topic + possible kahoot	

Lesson 2 General aim				
Continue to Introduce vocabulary related to the "climate change" topic and now also introduce topics related to activism				
Strategies	**Theoretical content**			**Intercultural domain**
	Communicative	**Lexical/grammar**		Watch the work of young activists around the world using a dynamic world map.
Understanding very simple sentences and texts while Identifying vocabulary accompanied by images related to the topics. Being able to say and repeat vocabulary related to the topic. Follow the sequence of stories with audio-visual support Fostering of critical thinking capabilities	Share opinions on certain topics. Oral production evenly distributed throughout the lesson (moments of discussion and activities)	Environment, recycling, activism related vocabulary.		

Procedure

Now that the "basis" of the topic is in place, this time the focus is on answering the question "what can we do?" in terms of contributing towards a healthy planet.

1-Opening routine-5min

Start by greeting students 1 by 1 who are starting to arrive at the classroom, this was made with the use of a "Social distancing greetings tab(attachment 1).
Students go to their seat and wrote the lesson, date and summary(climate change:what can we do?).This phase of the lesson is done with the presence of the "time-bomb" resource (attachment 2)

2- Warmup/vocabulary activation -10min

Visualization of the story "*The tantrum that saved the world*" –Introduce the story by saying something like, "There's someone who has a big problem on their hands and doesn't really know what they can do to stop climate change. . . . "

It takes students on a journey of activism that allows them begin to answer the question that guides the class.

3-Main body- 20-30 minutes

At the end of the story arises the question of what activism is, then explain and show 3 or 4 children activists in their respective countries, here: https://earth.google.com/web/data=Mj8KPQo7CiExYnBmNUZNY1ZRSjYtZHZBbUdDcHJxZElTRnJxZlFsOUcSFgoUMDVCRDg0OEJCNjE0MzRFMTRGQkQ

From here, reference that we can all contribute, no matter how small the contribution may seem, let's learn how with the "Planet Rescue" visualization. This will be done with the physical format of the book, with the video format used if needed.

From the book´s several lessons on what we can do to help the planet, recycling and its importance should be highlited in this particular lesson. Also, in the "save the bees" section of the book, it should be mentioned that such a small animal is one of the most important in our world, and that in the next class they would find out why.

4-Review of content -15min

The last part of the lesson consists of the "Recycling game". Here each student turns to the containers previously posted at the back of the room (attachment 6), choosing one at the time, which item belongs to each container.

Immediately after each student places their item in the container, they will be given the soup letter on recycling (attachment 7),allowing them to remain working while their colleagues wait for their turn to get up and participate on the activity.

Closing routine-5min
"What did we learn today?" or "what did we do that helps us learn more english?" moment.

Resources	
Computer, video-projector, worksheet, soup letters, "recycling game" materials, *planet rescue* (2019) book	
Time	**Type of work**
One 1h session	Single + group
Evaluation	
Continuous + Pupil's ability to do some exercises/ worksheet related to the topic + "recycling game"	

Lesson 3 General aim				
Continue to Introduce vocabulary related to the "climate change" topic and now also introduce topics related to "biodiversity" and "interdependency"				
Strategies	**Theoretical content**			**Intercultural domain**
	Communicative	**Lexical/grammar**		Observe in what ways humans rely on the planet´s yields on an everyday basis.
Understanding very simple sentences and texts while Identifying vocabulary accompanied by images related to the topics. Being able to say and repeat vocabulary related to the topic. Fostering of critical thinking capabilities	Share opinions on certain topics. Oral production evenly distributed throughout the lesson (mainly in the introduction and main body)	Environment, climate change, pollution, animals related vocabulary.		

Procedure

In this class the objective is for students to realize that in nature everything is connected in some way, and that even the smallest action has consequences.

After a brief recap of what they´ve learned last session, students should be reminded that in lesson 2 it was questioned about why bees are one of the most important animals in our ecosystem, in this class we intend to answer that, bringing us to the main points of the lesson, interdependency and the importance of biodiversity.

1-Opening routine-5min

Start by greeting students 1 by 1 who are starting to arrive at the classroom, this was made with the use of a "Social distancing greetings tab(attachment 1).
Students go to their seat and wrote the lesson, date and summary (Our relationship with nature).This phase of the lesson is done with the presence of the "time-bomb" resource (attachment 2)

2- Warmup/vocabulary activation -10min

Showing of an image (attachment 8) to start the first joint class discussion.

Pupils should be asked to describe what they were observing; what is happening in the picture; what message the cartoon is trying to convey, and what they thought would be a good title for the cartoon.

3-Main body- 20-30 minutes

1-Joint visualization of the following video: Biodiversity

The discussion of the video should lead students to realize how important our role and our actions are when it comes to protecting our planet. Something that they should already be aware of from the last 2 lessons, but it is never enough to remember.

2-Proceed to the read-aloud of the "Because of an acorn" picturebook.
This will be done using the physical format of the book.

Firstly, pupils are to be shown the name of the book as well as a real acorn, allowing them to imagine and take a guess regarding what the story will be about. Then throughout the story, students should be given space to predict the next step in the chain of events, all while consolidating their English vocabulary.

3- Construction of the story's timeline, through flashcards (attachment 9), where students will help to identify the sequence of events of the story, until a cycle forms, aswell as seeing why polinizers are so important in that cycle.

Here picked student´s should stand and attach the correct flashcard on the whiteboard.

4-Review of content-15min

Distributing of a worksheet (attachment 10), where students must number the sequence of events of the story and paint the "characters" of the story.

Joint correction of the sheet.

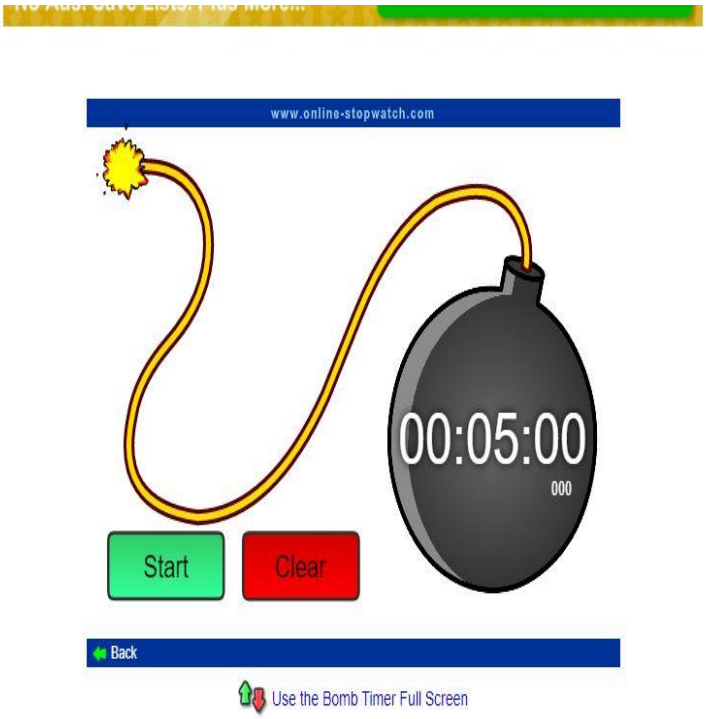
Lastly, every student will be given a real acorn, as a souvenir from their 3 lessons on climate awareness, and under the promise that they would go ahead and plant it, trying to take care of their own tree.

Closing routine-5min
"What did we learn today?" or "what did we do that helps us learn more english?" moment.

Resources	
Computer, video-projector, worksheet, *Because of an acorn* (2016) picturebook and flashcards	
Time	**Type of work**
One 1h session	Single + group
Evaluation	
Continuous + Pupil's ability to do some exercises/ worksheet related to the topic + timeline completion	

Attachment 1 (planed lessons): “Social distancing greetings”

Attachment 2 (planned lessons): “Time-bomb”



Attachment 3 (planned lessons): “Earth”

Attachment 4 (planned lessons): “Climate change poster”

Attachment 5 (planned lessons): “Climate change word search”

Name: _____

Climate change

C	E	R	J	R	T	E	E	A	R	T	H	V	A	C	H	M	E
O	C	F	Q	W	V	E	W	F	W	Z	G	I	X	L	E	S	N
U	I	W	X	E	G	R	M	E	Y	P	O	K	S	I	A	R	V
Q	Y	B	R	N	W	O	J	P	O	K	U	N	Z	M	L	T	I
G	G	V	Y	S	D	N	Q	K	E	W	A	U	Q	A	T	X	R
Z	P	O	L	U	T	I	O	N	H	R	Q	J	B	T	H	T	O
E	V	F	U	T	U	R	E	O	M	Y	A	V	X	E	C	I	N
X	Z	S	A	B	R	D	W	I	I	C	E	T	Q	S	K	W	M
B	W	E	A	T	H	E	R	I	A	K	V	S	U	Q	G	A	E
Y	F	H	X	R	U	S	K	X	I	H	R	A	D	R	K	B	N
V	H	E	A	V	Y	F	M	W	V	Q	L	P	O	S	E	C	T
U	G	T	R	E	C	Y	C	L	I	N	G	F	C	T	C	K	N

Find the following words in the puzzle.
Words are hidden → ↓ and ↘ .

CLIMATE
EARTH
ENVIRONMENT
FUTURE
HEALTH
ICE
POLUTION
RECYCLING
TEMPERATURE
WEATHER

Attachment 6 (planned lessons): “Recycgling game setup”

Attachment 7 (planned lessons): “Recycling word search”

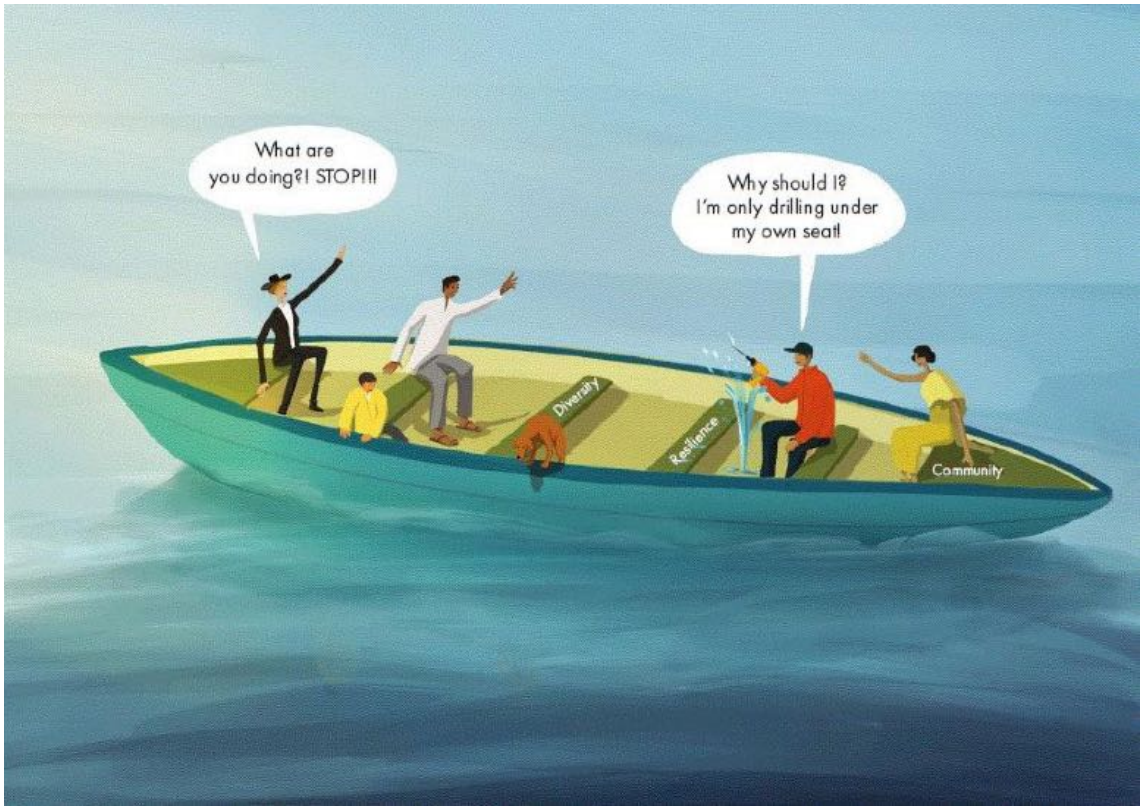
Name: _____

Recycling Word Search

W	C	A	R	D	B	O	A	R	D	U	N	S	M	U	K	E
Z	E	Q	K	A	N	M	C	C	W	G	B	H	S	V	C	H
U	Z	R	P	C	I	Z	K	C	D	E	G	H	B	O	U	I
O	E	N	E	R	G	Y	J	O	R	E	U	S	E	K	R	J
S	L	S	I	V	Z	G	A	M	C	M	V	W	J	B	J	F
D	M	S	K	S	Y	C	W	P	B	G	A	O	U	M	G	S
C	Q	J	E	W	R	I	G	O	P	L	A	S	T	I	C	E
M	C	L	O	T	H	E	S	S	A	A	O	N	M	N	Y	A
L	B	N	F	O	H	I	N	T	P	S	L	G	G	J	C	R
E	G	X	T	M	G	Y	A	C	S	S	W	Z	Y	Y	D	T
J	A	O	B	I	O	D	E	G	R	A	D	A	B	L	E	H
O	R	C	S	S	W	U	C	Z	P	S	O	D	K	E	B	H
R	D	F	N	B	C	Y	M	J	E	U	L	T	O	B	E	O
I	E	P	A	L	U	M	I	N	I	U	M	T	C	A	T	G
R	N	Q	T	V	U	F	N	L	L	Z	I	D	G	G	C	Q
T	W	U	U	G	K	F	R	N	P	X	W	M	R	R	E	N
E	A	U	R	I	F	H	D	T	J	R	N	J	E	X	J	M
Z	S	T	E	K	D	W	C	X	M	W	O	F	E	E	O	M
H	T	A	P	A	W	M	Z	B	D	L	V	G	N	F	K	J
Y	E	B	V	B	I	R	E	C	Y	C	L	I	N	G	Y	W
M	K	E	T	X	X	R	N	V	A	F	G	H	F	D	T	X
F	K	W	F	R	X	F	R	Y	C	K	O	D	L	F	L	Q

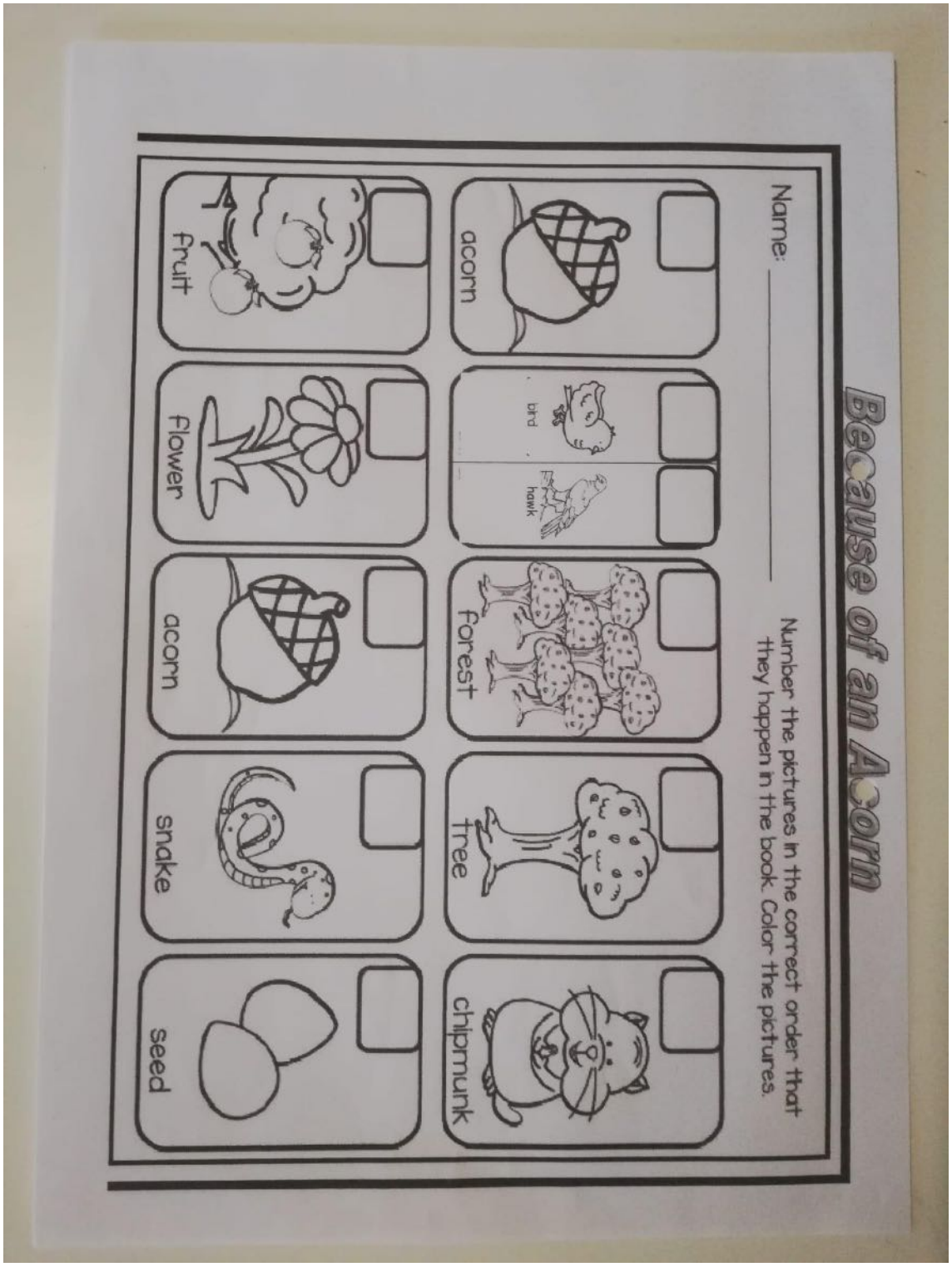
PLASTIC	NATURE	RECYCLING
GLASS	ALUMINIUM	GREEN
CARDBOARD	BAG	ENERGY
EARTH	CLOTHES	COMPOST
REUSE	GARDEN WASTE	BIODEGRADABLE

Attachment 8 (planned lessons): “Interdependency cartoon”



Attachment 9 (planned lessons): "*Because of an acorn* flashcards"

Attachment 10 (planned lessons): "*Because of an acorn* worksheet"



Annex 2: Pre-Questionnaire

P.PORTO

ESCOLA SUPERIOR DE EDUCAÇÃO POLITÉCNICO DO PORTO

Questionário

Este questionário faz parte de um projeto de investigação.
Ele é anónimo e confidencial. Por favor, sê sincero nas tuas respostas.
Isto não é um teste, por isso, não há respostas certas ou erradas.
Assinala com um X as opções que melhor correspondem à tua opinião

1) Já ouviste falar das "Alterações climáticas" ou do "Aquecimento global"?

a) Sim ☐ b) Não. ☐ Outra resposta:_____

2) De 1 (nada importante) a 10 (muito importante), quão importante achas que é aprender sobre isso na escola? Faz um círculo na tua opção.

1 2 3 4 5 6 7 8 9 10

3) Assumindo que as alterações climáticas estão a acontecer, quem/o quê achas que as estão a causar:

a) Atividades naturais. ☐ b) Atividades humanas. ☐

c)Não sei. ☐ d)Outras (Quais?):_____

4) Achas que a maioria dos cientistas:

a) Acredita que as alterações climáticas estão a acontecer. ☐

b) Discordam entre eles sobre se as alterações climáticas estão a acontecer. ☐

c)Acreditam que as alterações climáticas **não** estão a acontecer. ☐

d)Não sei. ☐

5) Achas que as alterações climáticas conseguem ter um impacto negativo nas plantas e animais do nosso planeta?

a) Não, quase nenhum. ☐ b) Mais ou menos. ☐

c)Sim, têm um grande impacto. ☐ d) Não sei. ☐

6) Querias/gostavas de saber e falar mais sobre este tema nas aulas/escola?

a) Sim. ☐ b) Não. ☐ Outra resposta: _____

Annex 3: Assessment sheet

Ficha

"Climate change"

Entregar dia 25 de Novembro

Name:_____ Class:_____

1) What is climate change? (O que significa "alterações climáticas"?)

2) How do we know it is happening? (Como sabemos que elas estão a acontecer?)

3) Who is causing it? (Quem as está a causar?)

4) What causes it? (O que as faz acontecer?)

5) Why should we worry? (Porque é que nos devemos preocupar?)

6) How can it harm animals and plants? (Como é que as alterações climáticas podem fazer mal aos animais e plantas do nosso planeta?)

7) What can you do to help our planet? (O que é que tu podes fazer para ajudar o nosso planeta?)