

Learnings for Future

Evaluation in terms of outcomes of an environmental education
program for teenagers

Alicia Requena Carrión

Supervisors

Naoko Tojo

Jonas Sonnenschein

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Tel: +46 – 46 222 02 00, Fax: +46 – 46 222 02 10, e-mail: iiiiee@iiiiee.lu.se.

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Abstract

In the present time, the rate of environmental degradation requires us to use all available means to avoid further damage and restore the environment to the best of our possibilities. Education is an important channel to promote environmentalism and sustainability, and to promote pro-environmental individual decisions, especially regarding consumption and purchasing patterns. The case study analysed in this thesis, the Aldea program in Andalusia, Spain, has been implemented in schools for nearly three decades, but its effectiveness in terms of outcomes has not been evaluated. The main existing evaluation process relies on self-evaluations. This thesis, as an evaluation for improvement, can offer insights on actual performance and potential of the program.

The evaluation of the Aldea program is structured in two perspectives: theory evaluation, to understand the current underlying logical structure that supports the implementation of the program and assess its soundness; and implementation evaluation, the study of the usefulness of the program's activities to reach its goals. This evaluation is undertaken through a case-based study that applies a mixed-methods approach: a quantitative measure of the performance in terms of outcomes through a survey and a qualitative study of plausible causes for the performance, based on document analysis and interviews.

The scope of the project is limited to six schools in the city of Granada, four participants and two non-participant that are a control group. The survey analyses outcomes of all six schools but one, and is limited to students of mandatory secondary education. The quantitative results in the statistical study show that participant schools did not perform significantly better than the control group. The main aspects that seemed to influence behavioural performance were belonging to the only school that made site visits and increased the contact of students with nature. The qualitative results show that there is a potential to identify the goals of the program more clearly, including behavioural change, which is currently implicit. They also point that it is helpful to set a continuous evaluation program and better communication with the wider educative community. Another recommendation is the further professionalisation of the program school coordinator role to provide stability to its implementation.

I hope that these recommendations would lead to an increase in the behavioural performance of the program and, therefore, contribute to the solution of our current environmental issues.

Keywords: Environmental Education, Purchasing Behaviour, Program Evaluation, Behavioural Change

Executive Summary

Introduction

Human society is currently at a critical point: environmental degradation has been accelerating in the past years, which has been added to the global situation of instability and economic inequalities. Concern about environmental issues is not a new matter and it has been on the public agenda since the second half of the XX century. One of the means to address these issues has been raising awareness through environmental education programs (EEP) (UNEP & UNESCO, 1975; UNESCO, 1987, 2015). These EEPs are supposed to empower individuals to make the right decisions through knowledge and have been implemented in many countries all over the world. Amongst others, there are two key areas that individuals can address to improve their environmental and sustainability performance: consumption and purchasing practices. These activities have been identified as crucial for a reduction of environmental harm because the responsibility for the impacts related to extraction and use of materials, production, distribution and disposal of waste, as well as of auxiliary materials for services, could ultimately be allocated to the final consumers (O'Neill, Fanning, Lamb, & Steinberger, 2018). It is unclear, however, how effective the EEPs have been at addressing these issues and what the outcomes of their activities are in this respect. There is a sense of urgency to attain the outcomes of behavioural change and positive environmental impact.

This thesis aims to evaluate an environmental education program in Granada, Spain. This program, called Aldea, is implemented in schools and high schools all over the region of Andalusia. This thesis targets teenage participants to obtain an insight on the program's current performance in terms of outcomes and especially regarding student pro-environmental behaviour. It also intends to suggest areas and strategies for improvement. The research is guided by the following questions:

- Q1. What are the stated and implicit goals of the Aldea program?*
- Q2. Does participation in the program Aldea have an impact on environmental knowledge, attitudes and behaviours, both in general terms and particularly in purchasing decisions?*
- Q3. What is the relationship between the level in which the educative community is involved in the program and the behavioural outcome?*
- Q4. What is the relationship between closer and more frequent personal contact with the natural environment and the program outcomes?*
- Q5. What are the key aspects of the program that could be improved to increase its performance on behavioural change?*

Case study

The research follows the case-based design approach, in which information from different sources is combined to attain a deep understanding of the theory and the implementation of the program. This information is collected and analysed through mixed methods: quantitative, through a survey that is filled in by students and that provides information on outcomes, and qualitative, through document and interview analysis, to learn about the functioning of the program and deduce potential areas of improvement.

The data sources were: documents obtained from the institutional website of the Office of Education and Sports in Andalusia and from some of the coordinators that are responsible of the implementation in each school; interviews with the Provincial Manager (*Responsable Provincial*) for the program in Granada, four school coordinators and one headmaster of a school that did not participate in the program as a control measure; and a survey which was filled in by

246 students from five schools: three participant schools and two non-participant schools that acted as control group.

The sample for the survey was chosen following two criteria: on one hand, the age group was defined considering the importance of teenagers from a commercial perspective, as consumers and motivators of consumption; and on the other hand, from the identification of an *adolescent gap* in existing literature, which refers to an age in which pro-environmental behaviours and attitudes seem to be lower than that of younger or older years. The specific schools and respondents were chosen through convenience sampling, based on availability.

The survey was analysed mainly through descriptive statistics to identify areas and factors that were significant to understand the outcomes. The qualitative analysis has been made through content analysis of the materials and the transcripts of the interviews.

The general structure of the evaluation follows both theory evaluation, in which the intervention theory and its underlying logic are reconstructed and assessed, and implementation evaluation, in which the activities included in the program are studied to find whether they correspond to the intervention theory logic. The analytical framework for program evaluation that guided the study has been the one defined by Vedung (2009).

The main limitation of case-based studies, and of the present thesis, is the lack of generalisability, because the sample is too small, the time of study too short and because many factors remained uncontrolled. However, there are results that are in line with previous findings in literature and that point out to areas of improvement.

Results

The reconstruction of the intervention theory shows a certain level of confusion in the explicit recognition of the goals. On one hand, the consideration of environmental education program leads to the provision of tools to solve environmental problems, among which pro-environmental behaviour is an important one. However, the program implicitly includes goals related to education for sustainable development when it mentions the Final Report on the UN Decade of Education for Sustainable Development (Buckler & Creech, 2014) and the Agenda 2030 for Sustainable Development (United Nations Division for Sustainable Development, 2015a), which broadens the scope of action to economic and social aspects. In addition to that, the Aldea program explicitly includes pedagogical innovation as a central objective. The concurrence of implicit and explicit goals that serve different purposes makes them vague and can potentially be conflicting. In fact, the pedagogical innovation goal is presented by the program administrators as an impediment to realise standard evaluations of the program in terms of outcomes. Apparently, such evaluation could deter coordinators to experiment with innovative and new methodologies.

The impact assessment, in which the program outcomes are evaluated, is based on the survey results and the information obtained directly from the stakeholders, interviews and Aldea program action plans and reports. The statistical analysis is based on the score obtained in different environmental indicators. Those scores are then aggregated in three main blocks, behaviour, knowledge and attitudes, and in other more detailed aspects within each block. The results of the survey show that students score higher in terms of attitudes, followed by knowledge and, finally, by pro-environmental behaviour. Among the detailed aspects, the students showed the least pro-environmental behaviour in purchasing. Girls scored significantly higher than boys in all main blocks except for the behaviour block. Students who participated in the program scored significantly higher than the control group only in the behaviour block, but the difference in score is lower than the difference between boys and girls. An interesting

issue that deals with communication is that most participant students were not aware of their participation in the program. The comparison between schools show that one of the participant schools, School 3, scored consistently higher than the others in all three blocks.

The content analysis of the interviews and the materials provided by the schools show that the educative community involvement is very low, sometimes inexistent, mostly because of lack of contact between the community and the institutions or the school coordinators. In addition to that, contact with nature is very limited because not all the projects within the program require it and schools often lack resources for site visits. Some obstacles were identified as well, with the prominence of the fact that school coordinators had no allocated time for their coordination work and the program has no funding available for site visits and other activities. The development of the projects is in many cases based on the personal interest of the coordinators who sign up for the job, and the only available incentives benefit teachers with little working time, leaving none for very experienced teachers to take up the role.

Conclusions

The main conclusions from the study are that goals for the Aldea EEP are not clearly defined and that there are potential conflicts among them, which hinders potential for evaluation. The statistical results show that overall the differences between the participant schools and the control group are not significant except in the case of the behavioural block, which means that the program is failing to address areas with potential in the knowledge and attitudes block. In any case, the differences in performance between gender, male and female, are still much more significant than those established between participant and non-participant schools. School 3, one of the participant schools, score significantly higher than the rest, including the other participant schools.

This could be partly explained by the relation of School 3 with nature. Among the participant schools, School 3 was the only one that had site visits specific to the program to enter in contact with nature, which supports theories identified in literature.

However, as stated before, the survey analysis shows little differences between schools. One possible explanation for this is the lack of communication among participants of the program and with the broader educative community. Considering the importance of community support and its role as reinforcement of pro-environmental behaviours as shown in the literature, this absence of communication and involvement could be part of the low level of effectiveness.

In addition to this, there are several obstacles to the implementation of the program that might hinder performance, the main one being the lack of professionalisation of the coordinator role.

Recommendations

The recommendations have been structured between those that address issues in the program's intervention theory and those that address implementation improvements

- Theory evaluation:
 - o Clearly define goals: It is important to define whether the program will continue to be defined as an EEP, and only cover environmental issues, or if it will transition to an ESD program, and address general sustainability aspects. Then, policymakers should decide the hierarchical position of the pedagogical innovation in relation with the other goals.
 - o Explicitly recognise the importance of behavioural change as program outcome.

- Regularly evaluate the program to facilitate continuous improvements: The clarification and definition of goals and outcomes could provide grounds to establish a process of evaluation for improvement by the definition of a set of standard indicators and the procedures to assess them.
- Establish communication with the broader educative community from the provincial school administration: The presence and performance of the program would benefit from a more institutional relationship with the broader educative community, such as companies and media, to encourage participation in the activities and normalise the program and its goals.

The figure I-1 below shows the reconstruction of the intervention theory as it seems to be and the suggested recommendations, depicted by dashed arrows.

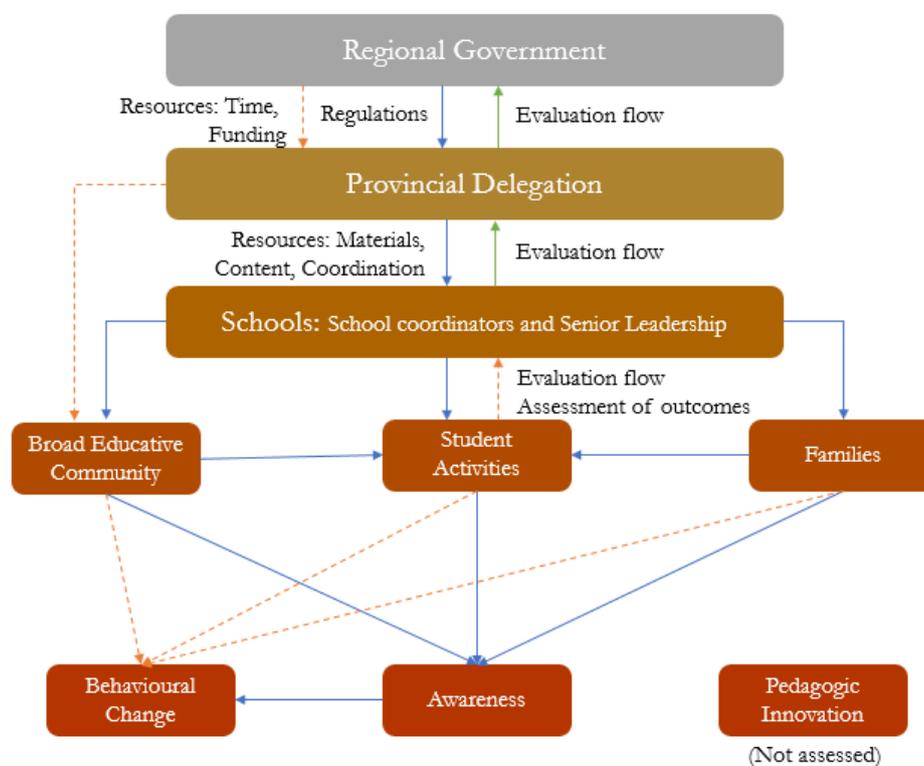


Figure I-1. Suggested Program Intervention Theory

Source: Author based on Weiss (1997)

- Implementation evaluation
 - Professionalise the coordinator role: Increase the professional benefits of assuming the coordination of the program in a school and provide more resources for its activities, mostly in terms of time and funding.
 - Swap the focus of the program from content to experiential activities, especially in nature: To increase behavioural change, the program must aim for activities that encourage it, mainly those that allow direct contact with nature and the establishment of a connection with it and include them in all lines of intervention.

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Abbreviations

ASEE: Andalusian Strategy for Environmental Education

CPR: Common Pool Resources

EE: Environmental Education

EEP: Environmental Education Program

ESD: Education for Sustainable Development

GFT: Goal-Framing Theory

NAM: Norma Activation Theory

SD: Sustainable Development

TPB: Theory of Planned Behaviour

VBN: Value-Belief-Norm Theory

1 Introduction

Human society is currently at a critical point: environmental degradation has been accelerating in the past years, which has been added to the global situation of instability and economic inequalities. Soaring global temperatures, loss of biodiversity, pollution and toxicity are increasing threats to nature and, therefore, humankind (Grooten & Almond, 2018; IPCC, 2018; UNEP, 2019).

Concern about environmental issues is not a new matter and it has been on the public agenda since the second half of the XX century. The strategies and tools that have been used to solve these problems have been many, and they have been implemented in different sectors, such as regulations, finance and the raise of citizen awareness. One of the means to raise awareness that has been proposed in the past decades has been the creation of environmental education (EE) programs (UNEP & UNESCO, 1975; UNESCO, 1987, 2015) which are supposed to empower individuals to make the right decisions to solve environmental problems. There are two key areas that individuals can address to improve their environmental and sustainability performance: consumption and purchasing practices. These activities have been identified as crucial for environmental degradation reduction because much of the responsibility for the impact of: extraction and use of materials, production, distribution and disposal of waste, as well as of auxiliary materials for services, could ultimately be allocated to the final consumers (O'Neill et al., 2018). It is unclear, however, how effective the EE programs have been at addressing these issues and what the outcomes of their activities are in this respect. The education for sustainable development (ESD) programs and EE programs (EEP) are very varied in nature, indicators and implementation, and careful assessments of both these programs and their implementation are generally lacking to the best of my knowledge. The urgent development required to attain the outcomes of behavioural change and, ultimately, positive environmental impact in this field, makes evaluation of ESD and EE even more relevant.

EE and ESD programs have been defined and implemented in many locations around the world and more specifically in Europe, as we can learn from the studies that have emerged from them (Nyberg, Castéra, Ewen, Gericke, & Ewen, 2019; D. Olsson & Gericke, 2015; Spínola, 2016; Varela-Candamio, Novo-Corti, & García-Álvarez, 2018; Varoglu, Temel, & Yilmaz, 2018). One of the European regions that embraced EE almost three decades ago was Andalusia, Spain. Andalusia is the most populated region in Spain with over 8 million inhabitants. It is located in the south of the Iberian Peninsula, and it has many different types of climates and ecosystems, including a desert in the eastern extreme and one the countries' rainiest areas in the south. The regional government launched its first attempt to EE through activities grouped within the Aldea program in 1992, in conjunction between the Regional Offices of Education and Environment with the goal to “*enable action, individual and collective, to solve present and future environmental problems*” (Servicio de Planes y Programas Educativos & Servicio de Educacion Ambiental y Formacion, 2018).

The Aldea program is a voluntary program for the schools which want to take part in it. It has different levels of involvement, both regarding the school setup of the program and the involvement of its members, teachers and students (Junta de Andalucía, 2018). The program has evolved since 1992 to become the second largest educational program overall in terms of student participation in the region. Although there are annual internal self-evaluations of the program, no external evaluation seems to have been undertaken in the past. The aim of this research is to study the case of the Aldea EEP to better understand the process, its outcomes, and potential. The city of Granada (Spain), one of the main capitals of the region, serves as the study geographical area to understand its strengths and weaknesses, and to provide insights on potential areas of improvement.

1.1 Background

Consumers in general, but particularly those in the developed world, exert a tremendous pressure on natural resources and services, and therefore cause environmental degradation (EEA, 2013). In fact, it has been estimated that household consumption is directly responsible for up to 65% of the global carbon footprint, 70% of global land footprint, 51% of the global material footprint and 81% of the global water footprint (Ivanova et al., 2015). According to the study by Ivanovna et al. (2015), all these aspects, except for land footprint, are highly correlated to national income (Ivanova et al., 2015). The impact related to the consumption of EU countries, such as Spain, is therefore higher than that of developing countries. In the specific case of EU countries, Ivanovna et al. (2015) found that the most impactful categories of consumption are transportation and food. The importance of the individual's decisions regarding consumption patterns and sustainable habits has also been identified in the Global Warming of 1.5°C Report (Babiker et al., 2018) and is relevant to the suggested mitigation scenarios.

The question of how to reach these behaviours is one of the main topics of environmental behaviour studies. Promoters of behavioural change should design strategies and tools that can encourage pro-environmental behaviour in the long run and in all sectors of society. One of the strategies that has been identified for this process of encouragement is environmental education (EE), as can be seen in sections 1.1.1 and 2.3. Considering that pro-environmental consumption behaviour is fundamental to tackle the current environmental crisis and that environmental education (EE) is one of the means to provide citizens with the tools to engage in more pro-environmental behaviour, the importance of environmental education programs (EEPs) must be recognized and their performance optimized.

1.1.1 Environmental Education

The main goal of EE according to the Report of the United Nations Conference on Human Environment (United Nations, 1972) is to address “the ordinary citizen (...) with a view to educating him as to the simple steps he might take, within his means, to manage and control his environment”. This is later included in the UNESCO-UNEP International Environmental Education Programme (UNEP & UNESCO, 1975) with a “focus on the formation of proper environmental attitudes, the clarification of social values, and the development of problem-solving alike” which serves as a basis to many other environmental education programs. It should be stressed that there is an implicit understanding that pro-environmental attitudes would lead to a more responsible behaviour towards the environment, although this is a correlation that does not always seem to hold true (Daniel Olsson, Gericke, Boeve-de Pauw, Berglund, & Chang, 2019).

The classic notion of behavioural change responds to a linear development that begins with an increase in knowledge followed by a development of attitudes and a change of behaviour. This would happen in a complex context that, in the case of students, is related to school, family dynamics, relationships with peers and media influence. Said classic notion has already been challenged, as stated by Mcguire (2015), who says that this relation would be non-linear and would not necessarily happen in the stated order. The specific processes of those relations are not fully clear.

Another classic approach to EE is the emphasis on content as the most effective way of leading to pro-environmental behaviour. However, a more experiential approach is becoming more prominent in the practical and theoretical realm of EE. Contact with the natural environment, as activities and field trips in nature, might be a determinant factor for the adoption of pro-environmental behaviours (Boeve-de Pauw, Van Hoof, & Van Petegem, 2019; Otto & Pensini,

2017). The concept of natural environment relates to the activities that are undertaken in environments away from the techno-sphere, understood as what “comprises our complex social structures together with the physical infrastructure and technological artefacts supporting energy, information and material flows that enable the system to work” (Zalasiewicz et al., 2017, p.10). In this thesis, transitional spaces between the biosphere and the techno-sphere, such as farms and gardens, are considered as part of nature as well. Experiential methodologies are applied in practice contemporarily with content based, and a general conclusion regarding its comparative impacts has not been reached yet.

And last, but not least, every program requires a proper implementation process to allow for optimal results. An intervention based on a sound underlying logic that links goals and outcomes, that is not also supported by achievable phases, actors, and processes, can hardly deliver what it is intended to do. Therefore, the analysis of the goals, processes, indicators and mediators of an EEP is a requirement for success. I would like to consider two specific aspects in the current case study: actors and mediators.

The main actors in the EEP Aldea are the students and the school coordinators, for they are the targets and the main entities deciding and acting upon the program respectively. Success of a program is partially dependent on the motivation and the resources provided to the main actors.

Program designers should also focus on potential mediating institutions of the processes. Mediating institutions are those “public spaces” where teenagers get in contact with other groups (C. Flanagan & Gallay, 2014, p.11). In the case of EEPs, the wider educative community seems to be an additional mediating institution towards a change in behaviour. I hereby consider the wider community as the broad social environment in which students’ learning processes occur. It includes high-school teachers and non-teaching staff, friends from inside and outside of the school, close relatives and neighbours of both the school and the students. Considering that in many cases students live nearby the schools because of the student allocation process primes proximity between school and living area, it is likely that the schools’ neighbours and the students’ neighbours partially coincide.

1.1.2 The impact of consumption and purchasing by teenagers

The purchasing power of teenagers has increased in the last decades (Gentina, Thomas, Tang, & Gu, 2018; Niu, 2017) and their consumption habits highly contribute to the increase in resource consumption, especially in the energy sector (Bell, Toth, Little, & Smith, 2016). Marketing research during the decade of the 90’s shows that young adults and teens had increasing allowances to spend and that they could also influence household purchasing decisions (Kaur & Medury, 2011). Considering teenagers’ stage of development, the experiences and decisions that they make during those years might impact the environment not only through their current practices, but also for the future when their values and mind-sets are settled (Moschis & Moore, 1979). Therefore, the current patterns of consumption of teenagers should be studied beyond the marketing perspective, which aims to enhance consumption and purchasing, and from a sustainability perspective, to promote sustainable and responsible use of resources and reduce the stress that current consumption patterns are inflicting upon the planet.

This situation is highly linked with the study of environmental and economic behaviour and the frameworks created to explain decision-making processes (Steg & Nordlund, 2013). However, the young adult casuistic is different from the adult one in terms of mind development and power relation to the family unit, and therefore requires a different perspective (Niu, 2017).

1.2 Problem Definition and Research Aim

The relation between pro-environmental decision-making process, specifically for purchasing and consumption in the case of young teenagers, and the EEPs that could encourage it, is not completely clear. The program design of EEPs and their outcomes are rarely conjointly addressed in evaluation studies, therefore the current base of knowledge misses an opportunity to relate program design and implementation with effectiveness (Boeve-de Pauw et al., 2019; Hughes, Richardson, & Lumber, 2018; Yildiz Yilmaz & Mentiş Taş, 2018). The mechanisms that govern behavioural change in the space of Environmental Education need to be unveiled to improve the design of these programs and their implementation. Connectedness to nature, in the form of activities and field trips in nature within or outside the school curriculum, is one of the main areas that are becoming the subject of enquiry regarding its potential for behavioural change (Boeve-de Pauw et al., 2019; Otto & Pensini, 2017).

This is also the case for the Andalusian EEP Aldea, in Spain. This program has never been publicly assessed in terms of outcomes and its evaluation can provide insights on potential areas of improvement to address environmental issues more efficiently in the future and therefore increase performance. In fact, basic knowledge about the processes and the underlying logic that links the program motivation and its outcome is largely unknown.

Teenagers have specific traits that make it important to study them as a specific social group. The main reasons for it are two: first, teenagers, unlike children, are partially independent regarding consumption decisions and can even be decisive in some family purchases as “advisors” (Niu, 2017) or even “nudgers”; second, adolescence is significant in terms of general pro-environmental behaviour. An “adolescent dip” in pro-environmental behaviour has been identified, which means that adolescents have lower levels of pro-environmental behaviour than those younger or older than them (D. Olsson & Gericke, 2015).

This thesis aims to evaluate the current environmental education program Aldea in Granada targeting teenage participants, to obtain an insight on its current performance regarding student *pro-environmental behaviour* and suggest areas and strategies for improvement.

1.3 Research Objective and Questions

As stated on section 1.2, the overall aim of this project is to evaluate a specific EEP in terms of pro-environmental behaviour with the intent to suggest areas of improvement and contribute to the fields of both EE and program evaluation. Pro-environmental behaviour in this research is considered the compound of those consumption or purchasing decisions that recognise their impact on the environment and are optimally made in environmental terms under the actual possibilities of the decision-maker.

This research specifically intends to measure the effectiveness of the EEP Aldea as it has been implemented in the city of Granada during the school year 2018/2019. It is aimed at assessing performance for the 2nd and 3rd years of Mandatory Secondary Education in five schools as an initial proxy to the general functioning of the program. The thesis has the objective to try to find a significant relation between the pro-environmental behaviour of students and:

- The implementation process of the Aldea Program.
- The type of activities in which students take part, with a special focus on their level of contact with nature.
- Each school’s implementation strategy of the program and the involvement of other sectors of society.

The behaviour is assessed in terms of consumption and purchasing patterns. Consumption includes water, energy and material consumption and management (prevention, reduction, reuse, recycling, energy recovery and disposal), as well as nudging parents, guardians or other people to buy things for them or for the family unit, which in turn represents an indirect purchase on their side. In terms of purchasing decisions, the research focuses on those areas from which adolescents can have some level of independence, such as small electronics, clothes, accessories and food.

The results seek to yield insights into:

- Program purpose, both explicit and implicit.
- Program implementation.
- Whether students who have been part of the program have higher pro-environmental behaviour than those who have not,
- Whether active involvement of the educative community influences the outcome of such behaviour, and,
- Whether contact with nature is a viable criterion to design educational activities in terms of behavioural change.

The case study is guided by the following questions:

- Q1. What are the stated and implicit goals of the Aldea program?
- Q2. Does participation in the program Aldea have an impact on environmental knowledge, attitudes and behaviours, both in general terms and particularly in purchasing decisions?
- Q3. What is the relationship between the level in which the educative community is involved in the program and the behavioural outcome?
- Q4. What is the relationship between closer and more frequent personal contact with the natural environment and the program outcomes?
- Q5. What are the key aspects of the program that could be improved to increase its performance on behavioural change?

1.3.1 Audience

The main audience for this evaluation is the public authorities of the Regional Office of Education and Sport (*Consejería de Educación y Deporte*). I consider that the ability to identify all obstacles that hinder an efficient encouragement of pro-environmental behaviour is very important because that helps identify areas of improvement that can be used by policymakers to implement changes in the program and increase effectiveness. In addition to that, increased basic knowledge can provide insights of possible improvements in terms of other outcomes.

The findings from this research could serve as a base to continue a systematic study of the program in other geographical areas. As a study of academic interest, this evaluation has a potential to increase generalizability and provide grounds to a theory of efficient implementation of environmental education policies.

This thesis could also serve as an addition to the current body of knowledge about EE and even ESD, although the latter is not directly addressed in the present study. ESD programs generally aim for an integration among environmental, social and economic development, which is much broader in scope than EEP. However, the problematic that both EE and ESD address and the obstacles in the way for implementation and positive outcomes are very similar. They tend to be evaluated following similar structures of knowledge, awareness, attitudes and behaviour as some of their main components, so much that many of the studies on ESD programs focus on

environmental issues (Boeve-de Pauw, Gericke, Olsson, & Berglund, 2015). My understanding at this point is that the subjects are close enough to provide insight into each other even if they are not the same.

Last, but not least, this study could also serve as orientation for school coordinators. The school coordinators for the EEP Aldea need to build a new action plan for the program every year. The findings of this study can contribute to enriching their activities and therefore lead to a general improvement of the implementation of the program.

1.4 Disposition

The contents of this thesis are structured systematically to provide a logical flow of information that allows for a clear picture of the current state of environmental education and the existing potential in the Aldea program. First, the literature review builds up a theoretical framework through the consultation of works in the fields of program evaluation, environmental behaviour, teenage development and environmental education studies in Chapter 2. I then explain the different methods that are used for the collection of information and its analysis in Chapter 3, so the results obtained and presented in chapter 4 are understood not only as they are but also in its context. After the presentation of the findings, chapter 5 discusses their validity to obtain further and general conclusions and how it could lead to further research and broader reach and evaluation. Chapter 6 provides a set of recommendations that could be implemented at different levels in the case of the EEP Aldea, to lead to the highlights of this study and its most important takeaways regarding what environmental education should be in Chapter 7.

2 Literature Review and Theoretical Framework

This chapter analyses the basic theoretical foundation to the present study. In it, I address four different fields that have been identified as relevant for the current project: environmental behaviour theory, that offers insights into the triggers that promote or hinder pro-environmental behaviour; teenage development, which helps understand the peculiar developmental aspects of the target group of this study; environmental education theory and studies, that review previous approaches to similar research studies; and program evaluation theory, which provides background as to what elements a program evaluation should consider.

2.1 Environmental behaviour and behavioural economics

The study of consumption and personal purchases requires the analysis of the processes that drive decision-making, and that include consideration of environmental aspects. This has been a subject of research in the field of behavioural economics.

In the mainstream theory of neoclassical economics, the *homo economicus*, coined in the XIX century, suggests that humans rationally optimize the obtention of goals in relation to the cost, which is called their personal *utility function*. The abstraction of a human who would use his rationality to optimise his personal gains irrespective of the common good lead Hardin (1968) to write his article “The Tragedy of the Commons”, where Hardin implies that leaving the market to manage public access goods, or commons, would lead to the overexploitation of such goods. The Tragedy of the Commons is often referred to as an argument in favour of public intervention in markets. On the other hand, Ostrom (2010) argues that common-pool resources (CPR) can be managed following a third way: small community management. According to her field research, small communities in which there is frequent simple communication are effective in managing and preserving local CPRs. This is not necessarily the adoption of a conception of human behaviour being irrational; it is a redefinition of rationality boundaries (Kesternich, Reif, & Rübbelke, 2017).

However, the promotion of environmental behaviour presents the difficulty of relating the ideological aspect that englobes the aims for a better environment and the complexity of assessing little individual daily actions (Carmi, Arnon, & Orion, 2014). According to Carmi et al. (2014), both approaches, general and specific to the context, need to be addressed in any action oriented to create behavioural change. They do not include the affective factor, which in other studies has shown to be highly influential to raise awareness. In fact, because some environmental issues such as climate change seem abstract and far from influencing individual lives, it is difficult to raise awareness among the general population because there is a lack of affective bond. A study on the effects of extreme weather events, such as a hurricane, has proven that people who have suddenly become aware of the its consequences shifted their awareness and willingness to pay and to accept actions to mitigate climate change (Bergquist, Nilsson, & Schultz, 2019).

If we look specifically into purchasing habits and decisions, Klintman (2012) points to two main streams of determining factors: rationality (Apollonian trust) and hedonism (Dionysian trust). The first one deals with the factual motives to purchase and to choose one product over the others. However, although from the *Homo Economicus* classical concept this would be the ideal decision-making process, Klintman (2012) asserts that Dionysian trust is a very important factor, and that it has both conscious and unconscious manifestations. Following Klintman’s argument, a pro-environmental purchasing strategy, program or policy should consider both.

As we have mentioned before, the classic notion of environmental rational decision-making through the basic cost-benefit analysis, in which the most positive outcome is the one that is

chosen, is not as simple as it seems. Although most environment-related decisions are reasoned, they are mediated by several factors. This mediation has led to the definition of different theories that aim to understand this decision-making process. The main ones are the Theory of Planned Behaviour (TPB), Norm-Activation Model (NAM), Value-Belief-Norm theory of Environmentalism (VBN) and the Goal Framing Theory (GFT) (Steg & Nordlund, 2013).

These theories relate to each other in the consideration they give to norms as fundamental drivers of pro-environmental behaviour. Norms, according to Vandenberg (2005), can be divided into social norms and personal norms. Social norms, or the pressure that society exerts on people to do the right thing, are very valuable towards promoting behaviour in very “close-knit” groups, where such pressure can be felt more closely. However, social norms do not work well in the case of “loose-knit” groups. In this case, personal norms, those related to the “internalized sense of duty to act or guilt” (p. 1104), are the ones that influence our behaviour and that can potentially promote pro-environmental decisions and actions.

The theories on decision making processes and environmental behaviour are based in several aspects, or mediators. The concepts that these theories work with are values, goals, beliefs, sense of awareness, worldviews, sense of responsibility, perceived control over the outcome and outcome efficacy, in addition to the social and personal norms (Steg & Nordlund, 2013). On one hand, most of them are related to the development of attitudinal aspects and except for personal generic goals, they can be grouped in the general category of attitudes. On the other hand, awareness, perceived control over the outcome and outcome efficacy are part of knowledge acquisition.

The differences that Steg & Nordlund (2013) establish between one theory from the others is the order of events through which pro-environmental behaviour is achieved, what aspect needs to be raised first and which follows, and which aspects are present, and which absent. The main issue addressed by these theories is the activation of norms and attitudes through pre-existing values and generic personal goals. Considering that these can change over time, they might be interesting areas to influence through EE. In two of these theories, TPB and GFT, knowledge is not a fundamental part of the system, likely because its existence is assumed. Knowledge is commonly considered a necessary condition for a pro-environmental behaviour, although it is not sufficient. At the same time, the required depth of knowledge to drive behaviour is assumed as whatever is enough to raise problem awareness (NAM) and capacity to influence outcomes (TPB, NAM and VBN).

Mcguire (2015) defines the identity-based environmental education (IBEE) model as a response to the lack of correlation between knowledge and attitudes and behaviours. In the IBEE model, the concept of self-identity becomes crucial to develop an overall pro-environmental behaviour that lasts in time, in opposition to the discrete actions, very limited in length and approach, that are often promoted in EE programs of all sorts: scholar, marketing campaigns, etc. The importance of acknowledging the existence of the psychological tension arisen from information dissonance, such as our habits being harmful to the environment, and the conscious and subconscious processes to alleviate that tension, point to considering pro-environmental self-identity development as one of the main factors towards positive results. Another important factor regarding the adoption of pro-environmental behaviour, specifically energy saving, as a result of a guided intervention is the preparation level of the participants. In a study conducted by Bell et al. (2016) among adolescents, it was shown that those participants who had a high level of awareness, or preparedness, prior to the intervention had much better results regarding behavioural change towards energy savings than those who had a lower previous level of awareness. This points out to the importance of considering that the actions designed for behavioural change might need to consider the phase in which the participants are and plan

accordingly, not only the actions, but also the time frames to expect results. However, Moser & Kleinhüchelkotten (2018) assert that pro-environmental identity adopt salient behaviours that have relatively low positive impact. Their findings point to a higher influence of income level on the adoption of pro-environmental behaviours.

The role that policies and programs play in environmental psychology and economics is also considered by many scholars. Following Jackson's article "Motivating sustainable consumption" (Jackson, 2005), individual behaviour must be coordinated to preserve the common good, and policies should aim at such coordination. Policies should, therefore, be designed to encourage behaviours and consumption patterns that would allow Sustainable Development (Jackson, 2005).

In sum, the mechanisms that can encourage or hinder pro-environmental behaviours are very complex. The influence of the community on the individuals, the affective relation to nature and the natural processes, the dichotomy between broad ideals and daily activities, personal norm and self-identity, all play a role in the decisions that human make regarding the environment. Policies and programs aimed at enhancing pro-environmental attitudes and behaviours should take all these variables into consideration and be designed accordingly.

2.2 Teenage development

The present study considers teenagers as people who are aged between 11 and 18 years old. Human developmental stage is unfinished at this age, for instance, in strategic and critical thinking, which are important parts of decision making. This strategic thinking requires a gist understanding of the phenomena around them. Gist understanding relates to the capacity to gather the global essence of a specific piece of content in opposition to the attention to detail. The capacity to engage in strategic gist reasoning begins at about 11 years old, and peaks about first year of college (Chapman, Gamino, & Mudar, 2011). As a consequence of this, their legal liability and responsibility is partial in comparison with that of an adult. Some legal age restrictions deal with minimum working age, substance consumption and political involvement through voting.

However, in many cases they do make decisions which impact the environment: they purchase items or participate in and influence family purchases (Niu, 2017), they consume energy and water in different forms and they have opinions and socialize.

Their decisions matter not only as the humans that they are now, but the adults that will become later in life. In fact, events that occur during adolescence shape people's minds and develop adults that believe that those events are of high relevance in general history, regardless of their objectively comparable importance (C. Flanagan & Galloway, 2014). It is therefore fundamental to understand and convey the processes that define adolescent decision-making and determine if there are relevant differences between the adolescent decision-making process and the general environmental behaviour theories stated in section 2.1 above.

According to Lavecchia et al. (2016), differences in decision-making processes exist between children and teenagers and teenagers and adults. These are related to the neurological development of teenagers. Their limbic system, action based and aiming for immediate rewards, is fully developed at this age. The prefrontal cortex, responsible for behaviours generally related to maturity such as patience or capacity to plan ahead, however, requires more time to develop and its development can stretch until early adulthood (Teffer & Semendeferi, 2012).

The study undertaken by Kaşot & Özbaş (2015) on ninth and tenth grade students in Turkey, shows that demographic factors have little statistical significance in terms of awareness of

consequence for the loss of biodiversity. This held true except for age: ninth grade students scored higher than tenth grade students, therefore pointing to the possibility that adolescence presents a dip in pro-environmental behaviour. This dip has also been identified by Olsson & Gericke (2015) and is in line with Lavecchia et al. (2016) findings. These studies reinforce the notion that adolescents should be considered a group on their own.

Teenagers mostly live in environments where family dynamics depend on their parents or guardians' choice. According to McLeod & Chafee (1972), we can distinguish four specific styles of family dynamics which influences the communication between the members of the family and the learning and development process of children and teenagers:

- Consensual: The communication relies on conveying concepts and ideas, but the hierarchy of the family must be respected.
- Pluralistic: The communication relies fundamentally on conveying concepts and kids are encouraged to make their own decisions.
- Protective: The communication relies fundamentally in respect of the family hierarchy. However, conceptual discussion is not undertaken.
- Laissez-faire: Teenagers and children are not subjected to conceptual discussion and are left to do as they please. We could consider that there is little intra-family communication.

According to Niu (2017), consensual and pluralistic family communication styles are related to a higher capacity to plan purchases by teenagers. Those families that have a consensual approach to their communication with their children and adolescents seem to accelerate the development of their executive functions. According to Sanan & Ahluwalia (2018), teenagers who spend more time with their parents tend to have purchasing patterns based on financial capacity, saving and other economic factors, whereas those who spend more time with their peers have more social purchasing patterns, based in factors like looks and perceived status. They also claim that mass media, mainly TV and internet, are high predictors of purchasing behaviours.

But it is not only the family dynamics, developed by parents towards their children, that influences family decision making. In fact, children, mostly teenagers, might also influence their parents' decisions. Teenagers are very connected to the media and the internet, which exposes them to vast amounts of product information from advertisement and user created content. This influence encourages purchases from young people, but also provide a knowledge base that is often unavailable to parents. This generates a reverse socialization process, in which teenagers influence family purchases through consultation from parents to children (Kaur & Medury, 2011), just as they can influence their parents' notions about environmental issues such as climate change (Lawson et al., 2019).

Purchasing has a very important role in adolescence. Not only it reflects on the satisfaction of material gratification, but it also has an influence in the development of individual identity at this stage (C. Flanagan & Gallay, 2014). Therefore, the process through which teenagers determine their place in society and the impact that they can inflict upon it and their environment is key to optimize their purchasing habits in environmental and sustainability terms. According to Flanagan (2013), the identification of teenagers' role in society comes from two different sources: first, their experience of the world. Like adults, adolescents create "lay theories" that help them interpret the reality around them. Most times those theories tend to justify the system they live in and tend to consider it fair and just. The second are mediating institutions, a concept that is central to Flanagan's theory; it is not only the teenager's bare

experience of the world, but also the context which is partly represented by complex entities, such as schools and group activities, that convey values and meaning to their reality. In fact, schools seem to be key to develop feelings of solidarity, critical thinking and environmental concern. Flanagan (2014) considers them mini-polity, environments in which values and communication structures amongst groups are developed. In addition to that, they are the places where young people spend most of their time. Therefore, the teaching style and the activities undertaken in schools, exert a major influence on their students, especially if the activities are in teams.

These two main sources of interpretations of the world, lay theories and mediating institutions, relate to the position that teenagers adopt regarding the environment and the commons, and their options for participation. According to Flanagan (2013), awareness of the risk and perceived shared awareness among students can lead to team efforts to preserve the commons, in clear reference to Ostrom’s theory. A very recent example of this process can be found in the movement “Fridays for Future” that has been ignited by the example of a 15 year-old Swedish girl, Greta Thunberg, who has inspired and led to activism to millions of other teenagers (Fisher, 2019; Fridays for Future, 2019).

Figure 2-1 summarizes the acquisition of pro-environmental behaviour process in teenagers and how it is influenced by many factors: knowledge, attitudes and a complex context which encompasses many different sectors and actors.

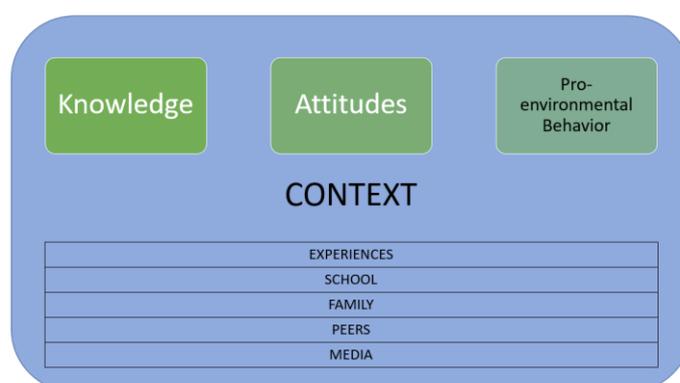


Figure 2-1. Aspects influencing behavioural change in teenagers

Source: Author based on Steg & Nordlund (2013)

2.3 Environmental Education Theory and Studies.

2.3.1 Environmental Education Theory

The concept of environmental education has not been static. Kopnina (2012) explains that the concept of environmental education has evolved since it was first introduced during the 1960’s. It had a clear environmental orientation at its inception, which has slowly been complemented with social and economic aspects. However, after the definition of the Agenda 21 in 1992, the term was later changed to education for sustainable development (ESD), emphasizing that environment and humankind needed to be equally considered. Kopnina (2012) acknowledges the importance of social and economic factors, but she states that in the ESD worldview the environmental focus loses importance to the point of becoming secondary. She then concludes that ESD might be counterproductive to increase awareness about environmental issues and the importance of environmental protection.

In addition to this, there is a further debate regarding the goals of EE and ESD. While EE and ESD are often looked at as merely information provisions, education is meant to engage students in critical thinking (Courtenay-Hall & Rogers, 2002). This view is addressed by the 2030 Agenda (United Nations Division for Sustainable Development, 2015b), which states in its goal 12.8 “ensure that people everywhere have the relevant information and awareness for sustainable development and lifestyles in harmony with nature”, therefore implying that what individuals need is the information and the awareness for a pro-environmental lifestyle, and that their final judgement should be trusted. This view is not unanimous, however. Jickling (2009) points to the importance of normativism in EE. According to Jickling (2009), not only EE goals raise highly normative questions, but also that these questions are present at “the intersection between education and ethics” (p.2). Some researchers and organizations state that the post-modern relativism claimed in respect to EE and ESD is at odds with the real concern about the rapid degradation of our environment and the needed actions that individuals should be taking about it (Kopnina, 2012). The Final Report of the World Education Forum (UNESCO, 2015), states that “Education increases environmental awareness and concern, and equips people with the skills and values to change behaviour and find solutions to environmental challenges (SDGs 12-15)”, in which behavioural change appears as a desired outcome of the education. But what if awareness and concern is not enough to adopt pro-environmental behaviours, as we have seen in the section on environmental behaviour?

2.3.2 Environmental Education and Education for Sustainable Development Studies

As mentioned in the introduction, EE and ESD programs have been implemented for decades. Some of these programs have been implemented for a long time, and therefore their results have been the target of studies aimed at measuring and potentially improving effectiveness. Most of them would include an in-house assessment phase, but the field has also been the target of third-party studies. There should be a general interest from the environmental and the educational sectors to evaluate such programs to promote the application of best practices in subsequent implementations.

General evaluations of ESD and EE programs, such as the one undertaken by Martin, Dillon, Higgins, Peters, & Scott (2013) about the evolution of ESD in the UK, are mainly based on institutional evidence and not on empirical evidence collected about outputs or outcomes. However, there are interesting learnings that can be obtained from these studies: programs would be more effective in general if there was a consistent set of objectives and basic procedures amongst them to reinforce learning and avoid duplication, and if sustainability issues were central to the educational policy. There is a loss in resources and strength of programs since different administrations which are competent on ESD and EE issues are not coordinated. The conclusions from this study can potentially be applied to different scales: from the coordination among schools pertaining to the same program, to regional implementations, to consistency between different programs within the same country or even in an international level (Martin et al., 2013).

Many of the evaluations of EE and ESD programs are general assessments of performance in terms of attitudes and behaviours towards pro-environmental protection and conservation or sustainable development (Boeve-de Pauw et al., 2015; D. Olsson & Gericke, 2015; Olsson et al., 2019; Varela-Candamio et al., 2018). Boeve-de Pauw et al., (2015) assessed ESD in school curricula in Sweden and compared schools which had an ESD certification with others that did not have it. The basic process was to analyse self-declared behavioural performance of the students and relating it to students’ perception of the classes in terms of being holistic and pluralistic. Holism refers to a multidisciplinary approach of the courses content and pluralism concerns about how discussion and critical reflexion is part of the teaching style. They found

out that an increase in pluralist-style classes show a significant relation with a higher level of sustainable behaviour, whereas an increased holistic approach improved sustainability knowledge and behaviour, but the latter to a lesser extent. In any case, their results indicate that ESD can be positive to future SD. The study by Varela-Candamio et al. (2018), having adults as the target group, finds a correlation between knowledge and green behaviour, which enforces the idea of indirect improvement mentioned by Boeve-de Pauw (2015).

However, there are other studies that are less positive about the outcomes of ESD or EE programs. In the particular case of the Green School Partnership Program in Taiwan, and ESD program, Olsson et al., (2019) could not find relevant differences between participant and non-participant groups regarding knowledge, attitudes and self-declared behaviour. Although this study covered several age groups, the lack of differences was consistent in all of them and, therefore, the conclusion is that the program was unsuccessful in creating the intended changes in comparison with schools that did not apply the program. One of the main takeaways from it was that sustainability should not be a subject in itself but a goal of teaching, since, as they claimed, “[the schools] teach about sustainability rather than *for* sustainability” (p. 192; emphasis added).

A common conclusion in many studies is that there is a gender-based difference in performance, and that girls tended to obtain higher scores and better progress than boys (Beiser-Mcgrath & Huber, 2018; Christensen & Knezek, 2015; Lawson et al., 2019; Daniel Olsson et al., 2019). In the specific case of Lawson et al. (2019), not only did girls progressed further, but also influenced more their parents towards more pro-environmental attitudes than their male counterparts. I consider that different cultural characteristics can compromise the potential of extrapolation of these results. In fact, some other studies show no statistically significant difference (Varoglu et al., 2018).

All in all, empirical studies about the outcomes of school ESD and EE programs mostly focus in small geographical areas and for short periods of time. There are clear difficulties on the practicalities of the data collection and analysis. First of all, researchers must be especially careful when dealing with a study involving underage individuals, not only in terms of obtaining legal access to them, but also to avoid inflicting harm to the participants in the study. Second, the age also limits the knowledge about psychological, social and economic aspects that can affect participants, moreover if the study requires self-declarations. Third, the duration of the programs generally expands for at least one year, sometimes even longer, therefore requiring a long time for analysis. This just confirms the need to continue research in this direction in the search of grounds for a theory. The results of many small studies could potentially be synthesised in a meta-study, or a much more ambitious empirical project to develop a generalizable theory.

Connection to Nature

There are studies that suggest that there is a relationship between the contact and connection with the natural environment and the levels of sustainable or environmental consciousness and behaviours (Cheng & Monroe, 2012; Frantz & Mayer, 2014). There seems to be a relation between the level of pro-environmental commitment that adults have with the experiences they had in nature in their early years, suggesting that adults with high pro-environmental attitudes have had a high level of connection to nature during their youth (Cheng & Monroe, 2012). On the other hand, Rosa, Profice, & Collado (2018) assert that this relationship might be mediated by multiple factors and that the inverse analysis, connection to nature during their youth as a predictor of later pro-environmental behaviour, did not hold. They claim that other factors might influence later relation to nature. Therefore, connection to nature during childhood might not be sufficient for adult pro-environmental behaviour. However, that does not mean that they

are completely unrelated. There is a chance that connection to nature during childhood might not be sufficient, but necessary, and therefore adult pro-environmental behaviour would imply that there has been a childhood connection to nature.

Otto and Pensini (2017) studied the relation between EE and pro-environmental behaviour through the mediators of environmental knowledge and nature connectedness in the case of 6th grade students in Berlin. Nature connectedness is understood as the connection that students develop with nature through the participation in activities within the natural context. The institutions that offer these activities are not necessary the schools where they study. They found that the relation between connectedness to nature and ecological behaviour was much stronger than that between environmental knowledge and ecological behaviour, therefore indicating a potential pathway for successful program implementation.

Hughes et al. (2018) aimed to find a threshold within Cheng et al.'s Connection to Nature Index (CNI), beyond which a higher level of connection would necessarily mean a higher pro-environmental behaviour. Their conclusion is that only high levels of CNI, connection to nature, would result in a high probability of pro-environmental behaviours, pointing out to a possible direction of causality. However, other researchers claim that there is still a lack of evidence that would support a determinate direction between pro-environmental behaviour and psychological restoration and affective relation with nature, which is one of the components of personal affective relation to nature (Whitburn, Linklater, & Milfont, 2019). In fact, Whitburn et al (2019) claim that the difference between appreciation of nature and appreciation of environmental protection, or environmental attitudes, should be established and studied separately. According to their study, connection to nature is directly associated with pro-environmental behaviour, albeit modestly, whereas environmental attitudes had a weaker association with it.

Boeve-de Pauw, Van Hoof, & Van Petegem (2019) analyse a specific activity that is often used as means to increase connectedness to nature: field trips. These trips, according to the authors, can be very successful in terms of effective learning about the environment if there is a novelty motivating factor. However, this relation is non-linear, which means that too much novelty would jeopardize the goals of the trip. Therefore, the activities within an EE program or an EE project should be carefully designed and approached even before the activities take place to optimise the results.

2.4 Program Evaluation Theory

The consideration of the adequacy and effectiveness for a program of policy is obtained through its evaluation. Policy evaluation is described as the “careful retrospective assessment of the merit, worth, and value of administration, output and outcome of government interventions, which is intended to play a role in future practical action situations” (Vedung, 2009, p. 3). Going down to further detail, Perea Arias (2005) indicates that evaluation consists on assessing a program systematically and objectively regarding its conception, implementation and results; and its main goals are to improve the program, resolve accountability issues, enlighten processes and exemplify good practices.

Vedung (2009) defines eight problems, or aspects, that the evaluation of a program or policy can potentially assess: program purpose, assessment of the overall aim of the program; evaluator, or what actor should be involved in the evaluation; intervention analysis, or study of the processes within the policy or program to be assessed; conversion, or the process that relates the motivation of the policy or program and the results; results, or intended outcomes; impact, or outcome analysis of the program; criterion, or what criteria should be followed for the evaluation; and utilization, or how the evaluation should be, or is, used. Each of these aspects

have different methodological approaches and I refer in depth to some of them below regarding aspects that are relevant to the current project.

The first aspect, purpose, deals with the importance of understanding what the reason for an evaluation is. According to Vedung (2009), there are three basic motivations for policy evaluation: accountability, policy improvement and basic knowledge and understanding of the policy. Accountability refers to the possibility of allocation of responsibilities for issues or low performance of the program. Policy improvement investigates the potential areas for improvement of performance of the program. Basic knowledge and understanding of the policy can be related to the intervention analysis aspect of the evaluation and relates to how the actors, processes and other elements of the evaluation relate to each other and lead to the outcomes, intended or not.

The evaluator aspect deals with who is the actor who can undertake the evaluation. The main categorisation of the evaluator is between internal and external, or formal and informal according to the terminology used by Schoenefeld & Jordan (2017). Formal or internal evaluation is that undertaken by the institution that manages the program or policy, or “*state-led*”, whereas informal or external evaluations are “*society-led*” (Schoenefeld & Jordan, 2017, p.3). Each type of evaluation has advantages and disadvantages which can reflect the need for one or the other depending on the context. In this respect, Schoenefeld & Jordan (2017) point to a divide between Northern and Southern EU countries regarding efforts in formal program evaluation, with southern countries having much “lower activity levels”. Outside evaluation is likely to be more critical than the reports and documents created by the official institutions, which can be of interest in Southern countries, but the lack of “inside detailed knowledge” of informal evaluations can be a limiting factor to their effectiveness.

According to Vedung (2009), the analysis of program outputs is aimed at the study of the intended outcomes or results from the program or policy, therefore evaluating its performance. It involves the development of a five-step process that will take the evaluator to the obtain the necessary information to report the efficacy of the program: reconstruction of the intervention theory, or the processes that are aimed at the intended outcomes; selection of monitoring strategy to obtain quality data; data collection methods and analysis; application of criteria and standards; and conclusions about the system.

The reconstruction of the intervention theory is the definition of the program theory, or the processes that are assumed to work towards the intended outcomes from the initial motivators. This aspect has been further studied by other scholars, with a special relevance of Weiss (1997). Rogers (2007) structured program theory assessment under two different perspectives: theory evaluation and implementation evaluation, based on the initial conceptualisation of evaluation by Weiss (1997). Theory evaluation addresses the intervention theory and the structure of the programmatic process to assess whether the underlying logic is sound. Implementation evaluation studies the practicalities of the program and the activities that it develops to analyse their effectiveness in following the programs rationale and intended outcomes. Theory evaluation is not only more theoretical but also broader in scope. It theoretically aims to look not only at intended outcomes but also those that were unintended. According to Rogers (2007), the study of the elements that represent a variation of the exemplar implementation of the program, often regarded as “*noise*”, can provide a much deeper insight to it.

The impact of the intervention is related to the outcomes that the program generates and the causal forces that can potentially explain them. Vedung (2009) considers outcomes unintended results, positive or negative, that stem from the implementation of the program or policy. According to the author, the main method to address impact is statistical. However, statistical

analysis has limitations regarding the scientific validity of the conclusions that derive from it. Although the methodology seems clear, there are several possible scenarios depending mainly on the sampling and the access to people and information that can hinder the obtention of statistically and fully scientifically relevant conclusions.

3 Methodology

The case study developed about the Aldea program used different sources of data and methods to analyse the findings and develop a set of recommendations. This chapter initially covers the research design and its scope, describing the theories that have been taken into consideration and how the evaluation has been scoped regarding the aspects of the evaluation to be analysed and the units of study that have been the object of the research. The middle part of the chapter describes the methods for data collection and data analysis, explaining how quantitative and qualitative methods will be used to yield the required conclusions. Finally, this chapter covers the ethical aspects that can apply to the project, which refer mainly to the access to personal information from underage students, and the limitations of the research, be them due to the methods or to the context in which the research was undertaken.

3.1 Research design

The present research evaluates a specific policy intervention in the real world, the EE program Aldea in Andalusia. The evaluation of the program follows Vedung (2009) as the main reference for analysing and assessing the different aspects that are required by the present thesis due to its relevance in the field and its comprehensiveness. However, I have consulted other authors in those areas that required a specific attention, such as theory evaluation.

The approach to the research is based mainly on two of the eight aspects defined by Vedung (2009): the analysis of the intervention theory and the impact of the intervention. The assessment of the intervention theory used the concepts outlined by Rogers (2007), highlighting the difference between the theory evaluation and the implementation evaluation. The analysis of the intervention theory provided the required information to respond RQ1. The impact of the intervention is the main part of this research and it is aimed at responding RQ2, RQ3, RQ4 and RQ5. Although Vedung (2009) states that statistical analysis is the main option to analyse outcomes, considering that the project is exploratory and descriptive in nature, the sole use of quantitative analysis would not be enough to grasp all the data that would be required to obtain a deep insight on the program. Therefore, mixed methods were also used for this part of the research.

I am specifically using embedded design (Creswel, 2014) to have a broader view of the aspect, following a case-based study structure to inform about general aspects of the program. The mixed methods are sequential, following an explanatory structure: first, the survey data describes the current state of behavioural outcomes in the current target group, and then open-ended data offer potential explanations to the survey results.

The general framework of the research is depicted in Figure 3-1. Using current knowledge of four disciplines, Environmental Behaviour and Behavioural Economics (section 2.1), Teenage Development (section 2.2), EE and ESD evaluation studies (section 2.3) and Program Evaluation Theories (section 2.4), all addressed in the literature review section, the study develops a conceptual model that is built up in two phases: on a first stage, I analyse actual pro-environmental behaviour from students through a survey, as means to approach and understand the existing phenomenon. This is the “symptomatic” analysis. On a second stage, the “diagnostic” analysis, the symptoms are interpreted through the assessment of the program and the insights of different actors.

The symptomatic analysis is performed through a positivist lens, whereas the diagnosis of the program is more related to a postmodern worldview in which subjectivity has a key role. This obtaining of information through different concepts is what Creswel (2014) would call a pragmatic approach. According to the nomenclature defined by Verschuren and Doorewaard

(2010), the present research is practice-oriented, since it addresses an actual policy and evaluates it, although intervening on it falls out of the scope.

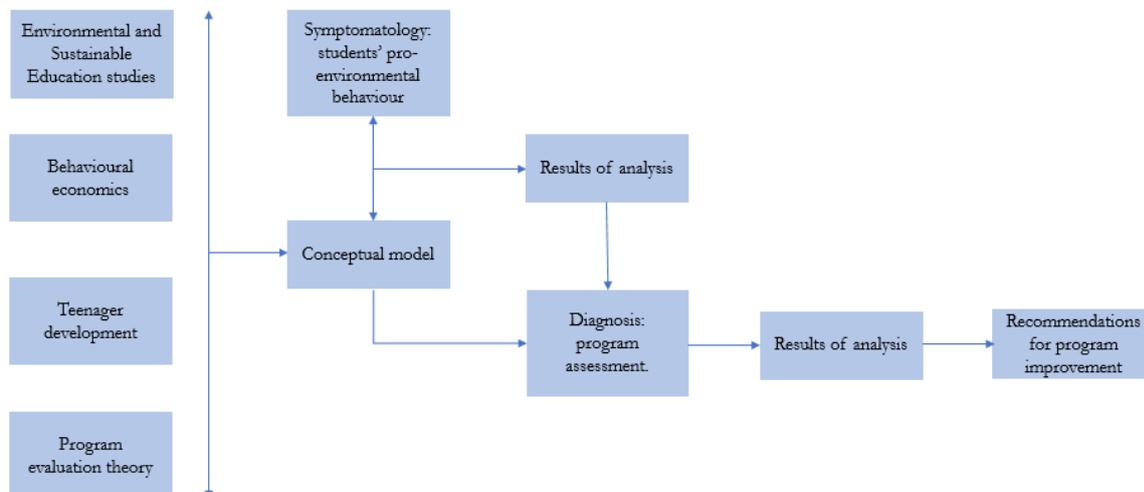


Figure 3-1. Research Framework of Policy Impact

Source: Author

The case-based research design is based on the methodology developed by Yin (2009). Case-based studies can, due to their mixed nature and the use of different sources of data on different features on the same case, provide a deeper understanding of a specific case, overcoming the limitations of other methods that can only analyse one feature or use a single analytical method. However, case-based studies have a lack of generalisability due to the fact that the unit of study is very limited, which represents a clear limitation.

The general structure for the assessment of the program is, following the classification by Perea Arias (2005), an external, ex-post evaluation according to results, objectives and processes. It is descriptive in nature although it aims to point out theoretical causal hypothesis that could be tested in future studies. In fact, the chosen design to illuminate causal impact is “Statistical Control” (Vedung, 2009), in which a proxy, schools that do not participate in the program, are used as counterfactual to assess outcomes. These schools and the students that participate in the study are not, as the participants in the program, chosen randomly due to the constraints of the project. The choice of a regionally limited evaluation of the EEP allows for a deep analysis of different types of data to obtain information that can be used to get an understanding of the dynamics of the phenomena under study and to suggest improvement strategies.

3.2 Scope and unit of analysis

The current project has been scoped down according to two different aspects: on one side, the scope of the evaluation is defined according to the motivations of the evaluation and the aspects assessed in it; on the other side, the evaluation has been undertaken in a part of the population that is part of the program, therefore limiting its reach to a few units of study within the entire potential pool.

Section 2.4 outlined the potential motivations for a program evaluation: accountability, program improvement and basic knowledge. In the current project, I merged both basic knowledge and improvement, which are later addressed jointly from chapter 4 to chapter 7. I understand that accountability is not relevant for this thesis because at the moment there is no personal or academic interest from my part to figure out who is accountable for any flaw or issue that arises.

This stems from the fact that there is little knowledge of actual program functioning and impact, and therefore, evaluating for accountability would oversee the gathering of information about its underlying logic.

In addition to that, and also as stated in section 2.4, I have not assessed all the eight aspects that Vedung (2009) refers to in his book, but only two: results or intended outcomes, and impact or outcome analysis. It is obvious that to be able to undertake this evaluation, some intervention analysis is also needed.

Research questions 1 and 5 have the aim to evaluate the general implementation of the program, first, recognising the actual goals that the program is supposed to seek (RQ1) and what are the options for improving the program's direct and indirect environmental positive impacts, regardless of those being amongst its explicit goals or not (RQ 5). The results of the intervention aspect refer to the analysis of policy outputs. Therefore, it is not directly related to the aim of this research except for one of the questions, the definition of the goals. In the specific case of RQ1, *what are the stated and implicit goals of the Aldea program*, I assume that the answer can be researched from two different points of view: first, a conceptual point of view can be taken, including aspects such as what the program must aim for as an EE program. This theoretical aspect was partly covered in section 2.3.1. Second, a normative viewpoint can be taken, or how the goals of the program reflect the aims of other policies and regulations of higher rank that affect the program. In the present thesis, I mostly refer to the normative aspect of the question.

As stated in section 2.4, analysis of the intended outcomes requires the development of five different steps: reconstruction of the intervention theory, selection of monitoring strategy, data collection and analysis, application of criteria and standards, and conclusions about the system. Considering the problematisation of the research, there is no need to undertake all five steps, but just the reconstruction of the intervention theory. The reconstruction of the intervention theory is aimed at recognising the goals of the program and the processes that are designed to achieve those goals.

The sampling of the survey participants is also part of the scoping of the research. Andalusia is a very large region, the most populated in the country, and there are hundreds of schools and high schools that participate in this program on a regional level. There were 995 participating schools and over 250 000 participating students in the course 2017/2018 (Consejería de Educación Junta de Andalucía, 2019). The current research project is scoped down to a very specific geographical region, the city of Granada. Regarding age, the neurological developmental state of adolescence has led me to conclude that teenagers should be considered their own group in terms of pro-environmental behaviour and purchasing practices; therefore, I scope the analysis to a certain level of education, 2nd and 3rd years of mandatory secondary education, which corresponds to ages 13 to 16.

Following Yin (2009), several units of study are defined to identify possible differences between one and the other. Each unit of study is a single school, participant or not. The definition of the units of analysis allows for a deeper study of the phenomenology of EE effectiveness and its implementation within the program, attending to many groups of stakeholders. Although there is a slight consideration of differences in context among the schools, based on the average income of the neighbourhood in which they are set, this does not imply an embedded multiple-case design. Therefore, the design of the study is an embedded single-case design.

A side effect of this scoping is that the number of projects or lines of intervention that can be assessed as part of the program is reduced. The program contains a total of 10 projects, but two of them are automatically out of the scope because of geographical issues: one of them is only

applicable to coastal areas and the another one is restricted to schools close to a natural reserve that is far from Granada. (Servicio de Planes y Programas Educativos & Servicio de Educacion Ambiental y Formacion, 2018). Therefore, I knew beforehand that I would not be able to include them in the analysis of the policy. In addition to that, the schools that I have worked with do not ascribe to all possible projects. The consequence is that the reach of my conclusions is limited to those lines of intervention that have been implemented by the assessed schools.

Sampling

The final survey assessment was made to 3 participant schools and 2 non-participant schools that act as control group. The number of schools contacted depended on two factors: reduced available resources to address many more units of analysis and willingness to participate from the schools after they were contacted. The schools belong to three different districts in the city, each with its own socio-economic characteristics. In addition to that, they all present certain internal heterogeneity in that respect. As an example, School 2 states that its pool of students is very varied in socioeconomical terms, but that in general they come from well-structured stable families (School 2, *Final Report on Aldea Program*, 2019). This adds a level of complexity which I was not able to address in depth in the present project.

The number of respondents to the survey was N=246, as shown in Table 3-1 along with the respondents per school. It was a mixture between purposive and convenience sampling for the respondents of the survey. The purposive sampling refers to the choice to assess outcomes in teenagers instead of assessing all potential participant students. The motivation to study this population lies in two fundamental reasons, as referred in section 2.2:

1. Teenagers are partially independent regarding consumption decisions and can even be decisive in some family purchases as “advisors” (Niu, 2017) or even “nudgers”.
2. This is a significant age in terms of general pro-environmental behaviour. An “adolescent dip” in that respect has been identified, which means that adolescents have lower levels of pro-environmental behaviour than those younger or older than them (D. Olsson & Gericke, 2015).

Table 3-1. Number of respondents per school

Row Labels	Respondents count (N)
<i>School 1</i>	56
<i>School 2</i>	51
<i>School 3</i>	25
<i>School 5</i>	71
<i>School 6</i>	43
Grand Total	246

Source: Author

In addition to that, convenience sampling also took place. This sampling stemmed from the fact that not all potential respondents were reachable for the current research project. As in any other study, respondents had to accept the survey and fill it in, but as underage citizens, the study also required formal written permission from the parents to collect that information. Considering that the survey data was collected at the end of the school year and the number of steps that were required to obtain the information, not all the students within the age frame from the chosen units of study responded to the surveys.

In addition to the survey data, I have interviewed 4 Aldea program school coordinators, 1 head of a school belonging to the control group and the Provincial Manager (*Responsable Provincial*) for the program.

3.3 Research Methods

The research strategy applied in this project consists in a case-based study that allows for a deep understanding of the program as it is applied in our units of study (Verschuren & Doorewaard, 2010). To obtain the answers to the research questions, a mixed-methods research approach is taken: quantitative analysis for the survey responses and qualitative analysis for the interviews and the documents. In fact, one of the main critiques that have been raised towards EEP evaluations has been the strong reliance on solely quantitative methods to address efficacy instead of using qualitative methods as well to better deepen into the issues that affect the programs (Carleton-Hug & Hug, 2010; Thomas, Teel, Bruyere, & Laurence, 2019). Therefore, in addition to the analysis of the quantitative survey information, the research undertakes content analysis of open-ended questions of the survey, interview responses and documents, as means to understand the most relevant concepts and considerations for the program.

3.3.1 Data Sources

The research questions were studied through the analysis of different sets of data gathered from different sources. The Ministry of Treasury provided public statistics about mean available income in each neighbourhood. The Regional Educative Innovation Office provided the documentary evidence about program design, basic functioning and the Reference Theoretical Framework, where coordinators can find the theoretical grounds to the program. The Provincial School Administration (*Delegación Provincial*) is the office in charge of the management of the program in the province of Granada. The main manager of the office and the team (*Responsable Provincial*) was interviewed about the implementation of the program. Six schools have taken part in this study, and they have been classified according to type of school and participation in the EEP Aldea. Five schools were public schools and one of them was a charter school, which are privately owned and managed schools with public funding to cover for students' tuition fees. Four schools, including the charter school, participated on the EEP and the other two conform the control group. The information from the schools was gathered through many different sources: surveys were filled up by students from all the schools except for one of the participant public schools, where it was not possible due to lack of time and coordination. All school coordinators and the head of one of the schools from the control group were interviewed as well. The final report of the EEP Aldea from two of the schools was shared for the project, as well as the Original Action plan from one of them.

All the case data sources as well as the type of information gathered from them are shown in Table 3-2 below. Most of the sources for data collection provided the information in Spanish as original language. Therefore, I inversely translated such data for the present research.

Table 3-2. Data collection methods per institution

<i>Institution</i>	<i>Type</i>	<i>Survey</i>	<i>Interviewee</i>	<i>Documents</i>
Ministry of Treasury	National Administration	No	-	Average available income statistics
Educative Innovation Office	Regional Administration (Andalusia)	No	-	-Public Documents (in bibliography)
Provincial School Administration	Provincial Administration (Granada)	No	Responsible provincial	-
School 1	Participant – public school	Yes	School Coordinator 1	-Action Plan -Final Report on Aldea Program
School 2	Participant – public school	Yes	School Coordinator 2	-Final Report on Aldea Program
School 3	Participant – charter school	Yes	School Coordinator 3	-
School 4	Participant – public school	No	School Coordinator 4	-
School 5	Control – public school	Yes	Head of School	-
School 6	Control – public school	Yes	-	-

Source: Author

Survey

First and foremost, information on the current behaviour of the students was obtained through self-declaration in surveys. Students were asked for hypothetical situations and statements, and their answers were coded to understand the level of pro-environmental behaviour. This was complemented with questions about their knowledge and attitudes regarding environment, and demographic data. The survey can be consulted in Appendix 1. The respondents filled in the survey in classes either digitally, through a Google Form, or on paper format. There is a limitation regarding the veracity of the responses; the fact that respondents declare their own behaviours and attitudes can potentially lead to respond what the respondents consider to be the expected answer instead of the answer that reflects their actual choices. However, considering the absence of relationship between the researcher and the students and the lack of motivation to choose the proper answer, I have considered that the responses mostly reflect the respondents' self-image. It is also true that the self-image might not correspond with the reality, but the alternative would be to follow the students in their daily decisions which would be unattainable considering the available resources and, more importantly, would raise much deeper ethical issues.

I used convenience sampling and passed the survey on schools that (1) were ascribed to the program Aldea, (2) provided the required authorization to access students' information, and (3) were scattered throughout the city in areas with different socio-economic conditions. In addition to this, the survey was responded by a control group from two different schools. It is important to note that convenience sampling does not allow for generalizability, but it does provide a valuable insight from the schools which can be of reference for the future, considering

that there has been no previous external evaluation of this program to the best of my knowledge. In addition to that, the control group provided a potential reference of impact of the program but could not be considered a proof of change or lack thereof.

The survey questions were each related to indicators of different environmental aspects and issues, as well as to social dynamics, to allow for interpretation. The relation between questions, indicators and connection to previous surveys and works can be seen on Appendix 2. Indicators approaching pro-environmental purchasing habits of teenagers have been limited, therefore there are only few previous references to the main subject of this project. Indicators can have different roles according to Lehtonen, Sébastien, & Bauler (2016): instrumental, conceptual and political. Although it is often difficult to differentiate one from the other, it is safe to assume that considering the current research project, the chosen indicators have a conceptual role, since they aim to help evaluate the program implementation. However, it is undeniable that instrumental roles have a presence, although it is low; it is obviously part of the project's motivation that the results of the study are used to inform policy decisions. Lehtonen et al. (2016) warn that indicators can be easily manipulated for any purpose and agenda regardless of the technical level. In the present study, indicators have been chosen carefully to: a) represent as clearly as possible the elements that reflect upon behaviour, attitudes and knowledge of environmental issues; b) provide consistency between the potential responses of all units of analysis; and c) avoid respondent fatigue, which could influence the final answers of the questionnaire.

The questions are aggregated into four different blocks: “What I do”, which corresponds to self-reported Behaviour, “What I know”, which corresponds to Knowledge, “What I think”, which corresponds to Attitudes and includes values and personal norms, and “Who I am” which gathers information from different demographic factors.

The scoring system for the survey has a maximum of four points, where one stands for the least pro-environmental score and four the most pro-environmental, except for specific cases that are addressed in the results Chapter 4 below. This scoring system reflects the use of 4-point Likert scales, which purposely avoided the neutral answer. Considering the respondents' age, I intended to eliminate the neutral option to avoid its abuse to finish the survey without deeply reflecting on the questions. The scales are defined from Never to Always in the Behaviour block and Strongly Disagree to Strongly Agree in the Knowledge and Attitudes blocks. Some of the survey questions are inverse, therefore the results have been adapted to reflect the general system during the analysis phase to provide proper comparison. The indicators' scores are later aggregated in aspects and blocks as means to analyse the data.

Interviews

Secondly, qualitative data was gathered from the *Responsable Provincial*, the coordinators from the collaborating schools, which have been four, and the head of one of the control schools. This data comprises personal experiences on how the program is being implemented, obstacles, potential that is not addressed and why, and general overviews of the areas of influence of each school.

In addition to the personal interviews, two teachers who have not been involved on the EE program responded the survey. The responses have not been used for the statistical analysis because they were not part of the defined sample. However, they are referred to in the results and discussion because they provide valuable information related to contextual and educative community aspects.

Documentary analysis

In addition to the background and literature review, there are several institutional documents that are relevant to the research. The documents that I analysed were the action plans and self-evaluation reports that teachers wrote for the program for two of the participant schools, and institutional orders and documents that are used for the definition of goals, programs and policies. The institutional documents provided insights on the general objectives of the program, implementation directives and updated information of suggested activities. The institutional documents defined what the program should be and why. The reports written by the coordinators included detailed information of the activities that take place, some of the problems or shortcomings that have appeared in them, and success indicators measures.

In addition to that, public data as average income per area was also collected. These data are intended to control circumstances that could potentially influence pro-environmental behaviour.

3.3.2 Data Analysis

In general terms, I applied Vedung (2009)'s structure on program evaluation to assess whether the objectives of the program are aligned with the results obtained in the symptomatic and diagnostic research phases. Therefore, it was necessary to define actual objectives of the program, collect data in relation to those objectives and process such data to finally conclude whether the outcomes of the program aligned with the program's goals.

Document analysis

Institutional document analysis informs the reconstruction of the intervention theory. It allows the identification of the explicit and actual objectives of the program and the implemented processes for its attainment. This information leads to the answer of RQ1 and serves as the basis for the general evaluation.

The main institutional documents analysed for this project are:

- Reference Theoretical Framework (*Marco Teórico de Referencia*). Published each year by the Education and Sports office of the Regional Government of Andalusia (*Consejería de Educación y Deportes, Junta de Andalucía*) and provides the theoretical and normative background which supports the definition of the program.
- Informative Dossier of the Aldea Program (*Dossier informativo "Aldea, Programa de Educación Ambiental para la Comunidad Educativa"*) which offers insights on the specific processes that need to be addressed by the coordinators.
- Evaluation rubric for the Aldea program action plan (*Rúbrica para la valoración del plan de actuación*) which indicates suggested contents for the action plan.

In addition to these, the official national and regional regulations regarding the hiring process for teachers and the recognition of merits have been consulted.

Descriptive statistics

The symptomatology of the program functioning was addressed mostly through descriptive statistics of the survey answers. The variables in the survey were in a majority Likert scales or numeric, with few instances of categorical variables. The Likert scales were used to find correlations between variables and undertake hypothesis testing. When necessary, dummies were introduced to assess the information regarding the categorical variables.

The survey answers were aggregated by block, each related to a section of the survey: knowledge (what I know), attitude (what I think) and behaviour (what I do). Purchasing practices is a sub-block that is extracted from some of the questions within the behaviour block. Each of these blocks would then have their own score. In a more granulated level, the answers were also aggregated by aspect. The analysis of these scores intended to shed light on RQ2. The information provided by the aggregation of the scores in blocks and aspects intended to answer the research question, but it also looked into other demographic factors that have been recognised as important in literature, such as gender (Daniel Olsson et al., 2019).

This statistical analysis played a major role to understand the symptomatology of the program's efficacy. As stated before, the indicators were aggregated in general scores, but some of the indicators have been specifically analysed on their own. T-test was used to establish whether the differences between the participant and non-participant groups were statistically significant. The relations between aspects were assessed in terms of correlations, and although their significance was evaluated, I did not intend to use them to make causal claims on their own.

The purchasing practices have been assessed independently and some demographic indicators have been applied to control some of the responses in the attempt to answer RQ2. The analysis has been made to understand the general performance of the group and then distributed by schools so a comparison can be made between participant and non-participant schools. Thus, a deeper analysis on praxis and performance could be undertaken through the interviews and the documentary analysis.

Content analysis

Content analysis of the interviews and the qualitative answers of the survey provided context and a deeper insight to understand the implementation of the program, identified potential areas of improvement and complemented the information gathered on the document analysis, supporting the answers to RQ3 and RQ4.

3.4 Ethical considerations

The research aims to evaluate an EE program for underage students. Children and teenagers are a social group especially protected due to their developmental stage and requires special care and attention. As one of the most important elements of this research is a survey that must be responded by said students, my research had direct contact with them. This raised important ethical questions that needed to be addressed. I have used the guidelines from ERIC (Ethical Research Involving Children) (Eroglu S., Toprak S., Urgan O, MD, Ozge E. Onur, MD, Arzu Denizbasi, MD, Haldun Akoglu, MD, Cigdem Ozpolat, MD, Ebru Akoglu, 2012), which is a project aimed to assist researchers when dealing with a project that involves underage individuals. After confirming that the information gathered from students is absolutely necessary to obtain the diagnosis of the present study, and, considering that the topic is not sensitive in nature, I continue with the data collection as per ERIC's guidelines on Ethical Research.

As a first step, I established contact with the schools and obtains their collaboration. It was school personnel, and not me, who provided the questionnaires to the students so they could fill them in. There was no personal contact between me, the researcher, and the students, and the information was collected anonymously in both the web and paper versions making it impossible to trace the answers to a specific student. Approval form for parents were sent out to authorize the participation in the program, and they were required for the data collection.

Schools, coordinators, parents and students had the right to refuse and interrupt the data collection and the use of their data at any point during the study. To clarify the conditions under

which they participated in the research, I created a website where some information about the project and the conditions for participation were uploaded (<https://evaluacionprogramaaldea.school.blog/>).

All interviewees had access to the project's information and conditions through the website and orally before the interview. All of them expressed their acceptance of the conditions and the consent was recorded. Most interviews were conducted anonymously, and the text was sent to all those participants who stated interest in it. In the specific case of the *Provincial Responsible* anonymity was unfortunately not possible because he is a public figure and the only one who held this position. In his case, the draft was sent to him before the final submission for publication so he could comment or even change the opinions that were expressed as his.

All the information thus obtained and here presented were analysed and communicated following explicit and published criteria.

Finally, I had held the role of school coordinator in the past, but I declare that my previous participation in the program has not influenced the collection or treatment of the information. In addition to this, wherever I expressed information based on my own past perception, it is clearly stated in the text for clarification.

3.5 Limitations

First of all, the fact that this project is an external evaluation implies an important limitation on its own, and it is the lack of detailed inside knowledge (Schoenefeld & Jordan, 2017). However, my previous experience on the field as a teacher and coordinator avoids part of that limitation.

It must be noted that any study on environmental behaviour entails a high level of difficulty. First of all, and previously stated, the method to obtain behavioural information requires self-declarations which might not correspond with the reality. Unfortunately, considering the available resources for the study and that self-declarations are common in similar research, this has been the final method that was applied. In addition to that, there are several variables that could be studied, such as attitudes, knowledge and concern amongst others, but also each variable can be studied in relation to a domain, for instance, e.g. water saving, which can also be divided into subdomains, e.g. reusing water from rinsing vegetables for irrigation (Carmi et al., 2014). Every aspect, variable, domain and subdomain, present “different motivations, limiting factors and situational factors” (Carmi et al., 2014), which increases the complexity of the study and the difficulties to arrive to statistically significant conclusions that can be relevant to support a theory. Finally, the specific focus on purchasing behaviours is relatively novel to the field, and there are only few instances in which comparability can be made with previous research. The current study does not aim to theorize the obtained results; it is hoped that the conclusions obtained point to directions where the field can move on based on the throughout study of a small sample.

The statistical analysis presents limitations on its own. The sample has partially been chosen by convenience and it is relatively small; there is also a lack of heterogeneity in it. The students live in urban or suburban areas, leaving out of the sample students living in rural contexts. The teachers that have agreed to the interviews were not representative, because within the spectrum of working conditions, theirs are relatively homogeneous, as explained in section 4.1.2 below. Therefore, the results are not generalisable. In addition to that, Likert scale data is used as interval data (not ordinal) to allow for T-testing to find out what are statistically significant differences among the study population and what is not.

Another circumstance that limits comparability has been the time factor. The school term ended shortly after the project had started. This required a rapid development of the data collection tools such as survey and interviews even before finalising the establishment of the research framework. Therefore, comparability to previous studies is at points lost due to differences of indicators. On the other hand, as stated before, one of the main foci of the project was to assess teenage pro-environmental purchasing behaviours, which have been assessed very little to the best of my knowledge. Regarding other elements, such as consumption patterns, the answers can be converted to previous scales in most cases. Appendix 2 provides a table relating assessed indicators in the present study with existing scales.

In addition to that, the fact that this study has started at the end of the school term in Spain means that all students and teachers were under pressure from the final exams, which might have influenced the response rate.

Finally, the length of the study in time, a single semester, made it impossible to establish a before-after comparison within the group, which means that the only possibility to assess change motivated by the program, and therefore, program outcomes, was through the use of the control group as a proxy. Short timeframes are a common limitation to many EEP evaluation processes according to Carleton-Hug & Hug (2010), who state that not only before-after comparisons should be made, but also consider the actual outcomes further in time. In addition to that, teaching and program practices change from the control group schools to the participant schools and within each of the groups as well, which undermines the validity of the proxy and the assessment of the program as the motivator of potential differences of knowledge, attitudes and behaviours.

4 Results and analysis

As stated in the methodology chapter, the general assessment of the program is carried through the application of the system described by Vedung (2009), which has been adapted for this study. From the eight aspects that can be responded by program evaluation, I address two in this chapter: the results or intended outcome aspect, to the extent of reconstructing the program's intervention theory and answer RQ1, and impact aspect, that deals with the outcomes of the program and aims to find some indication of causation to them.

4.1 Reconstruction of the Intervention Theory

The intervention theory, according to Vedung (2009), should define the goals of a program or policy and the process that is setup to achieve those goals. These two aspects are analysed first to convert implicit goals in explicit, evaluate the underlying logic of the program and, finally, to evaluate whether the activities implemented within the program respond to the requirements of those aspects. These two final aspects have already been mentioned as the duality of theory evaluation and implementation evaluation (Rogers, 2007).

4.1.1 The goals of the Aldea Program

The main findings about the program's goals lead to the discovery of two types of goals: explicit, which is the inclusion of EE in the schools and pedagogical innovation; and implicit, which is the pro-environmental behaviour encouragement. The analysis is made following a normative approach according to the legal basis in which the program is founded.

According to the Reference Theoretical Framework of the program Aldea for the year 2018/19, the first objective of the program is "To develop an EE program from a holistic perspective, with innovative pedagogical foci, encouraging the participation of the entire educative community [...] and promoting themes and intervention lines about different scenarios and environmental issues" (Servicio de Planes y Programas Educativos & Servicio de Educacion Ambiental y Formacion, 2018, p.7). The *Responsable Provincial* for educative programs, responsible for the implementation of the program Aldea in the province of Granada, refers to the goals of the program as "encouragement of pro-environmental awareness and pedagogical innovation".

The Reference Theoretical Framework describes the conceptual and regulatory antecedents that justify the need for the program and the goals that should relate to environmental education. In this document, it is stated that EE aims to "*enable action, individual and collective, to solve present and future environmental problems*" (Servicio de Planes y Programas Educativos & Servicio de Educacion Ambiental y Formacion, 2018, p.2). As a complement of this statement, the Reference Theoretical Framework references the Andalusian Strategy of Environmental Education (ASEE) (Consejeria de Medio Ambiente & Junta de Andalucia, 2006), which is a document written after a complex multi-stakeholder process in which EE, the need for it, its benefits, goals and potential pathways are analysed in depth. One of the specific objectives that the document assigns to the ASEE is to "*boost the adoption of pro-environmental behaviours*" (p.22). The fact that the adoption of pro-environmental behaviour could be one of the goals of the program adds another level of complexity to it, since providing information and raising awareness might not be sufficient to obtain behavioural change as stated in the literature review.

Another reference included in the Reference Theoretical Framework is the UNESCO Global Action Programme on Education for Sustainable Development, based on the Final Report on the UN Decade for Sustainable Development (Buckler & Creech, 2014). The Reference Theoretical Framework includes this reference as means to promote "*the acquisition of knowledge, competences, values and attitudes with which [students] can contribute to sustainable development*" (p. 11). The

document includes these notions as orientations towards the pedagogical methodology towards pluralism. However, the inclusion of this notion takes the intervention conceptually away from EE and brings it closer to ESD without approaching the possible conflict.

Educative innovation is also mentioned in the Final Report on the UN Decade for Sustainable Development as a consequence of SD, but not as one of the main goals of ESD programs (Buckler & Creech, 2014, p.31). It should be noted that this differentiation regarding pedagogical or educational innovation and the traditional pedagogical methods, is often made regarding innovation to be a more participatory and democratic pedagogical process (*Responsable provincial*, personal communication, 2019). This aligns with the discussion that Courtenay-Hall & Rogers (2002) raise regarding the theory that EE must aim for behavioural change (Kollmuss & Agyeman, 2002) instead of leaning towards the general educative principle of educating students to have a critical perspective of things which dominates the pedagogical view of ESD.

The documentary evidence provided by the school coordinators and the interviews (School 1, Action Plan, 2019; School 2, Final Report on Aldea Program, 2019; School Coordinators 1, 2, 3 and 4, Personal Communications, 2019) point clearly towards three different goals: raising pro-environmental awareness of the students, generation of pro-environmental habits and the understanding of the complexity of the ecological-sociological-economical system. Pedagogical innovation was not mentioned as one of the main goals. The understanding of the interaction between the ecological, sociological and economic spheres is undertaken from both the holistic and the pluralistic perspectives. The holistic perspective acknowledges and uses content of areas other than environmental studies, and the pluralistic perspective, raises critical thinking processes in students and recognises different perspectives. These perspectives move the program away from the EE theory and closer to the ESD as in Boeve-de Pauw et al. (2015). The specific case of one of the projects defined within the program, which is aimed at recycling and resource efficiency (*Recapacicla*) is also used as to fulfil an implicit goal to keep cleaner facilities and improve the social harmony within the school, which is both a secondary goal and an indicator for some of the interviewees (School Coordinators 2 and 3, Personal Communication, 2019).

4.1.2 The Aldea program. Actors and Implementation

The EE program Aldea is very complex in its implementation. To better express the main parts of the program and the stages in which it is divided, I have structured this section in Actors and Implementation. Most of the information provided in this section has been obtained from the program documents provided by the Regional Government (Consejería de Educación Cultural y Deporte de la Junta de Andalucía, 2014; Consejería de Educación Junta de Andalucía, 2019) unless otherwise stated.

Actors

As written above, the program aims to “*enable action, individual and collective, to solve present and future environmental problems*”. The process to achieve these goals requires the direct involvement of different actors: the *Responsable Provincial*, the Senior Leadership Team, led by the School’s Headmaster, the School Coordinator and the Students, as shown in Figure 4-1. The broader educative community is acknowledged as an important actor but there is no explicit connection to the program.

The *Responsable Provincial* for the province of Granada had been on the job for over a year at the time of the interview. This position is usually offered based on competition which requires a complex exam and proof of experience and merits according with Spanish laws (Ministerio de Hacienda y Administraciones Publicas, 2015).

A Head of a public Spanish school reaches this position after appointment from the division of inspection, which manages the schools within a specific area, and/or teacher board elections. This is a very senior position most often covered by a teacher who has earned a fully permanent teaching position as civil servant. In the case of my interviewee, he works at a very well-established secondary school in the city, and a very sought-after teaching destination.

The School Coordinators are teachers that take on an extra role in the school system. Those that have participated in this project are mostly homogeneous in terms of working conditions. However, this is not the case for all coordinators. The coordinators can teach at public, charter or private schools. Those belonging to the public education system belong to different categories: they may either have earned a temporary position with no permanent placement after passing the public exams but not ending first amongst peers in the competition, or they can have earned that permanent position, therefore securing their jobs practically until the end of their working years. This last situation opens two different possibilities: newly appointed permanent teachers with no permanent placement and that can be moved from one school to another, and more experienced teachers with permanent placement in a determined school. It can take several years to obtain a permanent placement at a school of the teachers' interest (Ministerio de Educación, 2015; Ministerio de Hacienda y Administraciones Publicas, 2015; Presidencia de la Junta de Andalucía, 1985). In Andalusia it is common that some teachers without permanent placement are sent relatively far from their desired destination because they lay lower in the preference queue. Often this distance takes teachers to provinces which are different from the one they live in, several hours drive away. The participation in an educational program such as Aldea provides merits that can be added to their resume and also put them higher on the list for all those that have no permanent placement or position – to an extent (Consejería de Educacion Cultura y Deporte de la Junta de Andalucía, 2014).

The school coordinators contacted for this thesis belong to both public and charter schools. A very detailed account can be found in Table 4-1. In this specific case, the three public School Coordinators, coordinators 1, 2 and 4, are teachers with fully permanent teaching positions. In terms of the program, two of them have run it for three years and over seven years respectively, and the third is a first-year coordinator. The experienced teachers are science teachers, whereas the novice is an economics teacher. Only one of the experienced teachers has a permanent placement, whereas the other two are expecting to obtain their final placement in the years to come. Only the novice could use extra certifications from educational programs to improve his chances of getting a good placement, whereas the other one had already achieved the maximum points that she could get from educational program participation. The charter schoolteacher is a first-year science teacher, and his placement will remain if the school keeps hiring him.

Table 4-1. Aldea EEP school coordinators

	Teaching area	Working category	Years of experience in the EEP Aldea
School Coordinator 1	Sciences	Full permanent position – non permanent placement	3
School Coordinator 2	Sciences	Full permanent position - permanent placement	+7
School Coordinator 3	Sciences	Charter schoolteacher	1
School Coordinator 4	Economics	Full permanent position – non permanent placement	1

Source: Author

As most educational programs in the region, it is optional for schools to participate in the EEP Aldea and, even if the school decides to register for it as an institution, there is no obligation for any teacher to take up the role of coordinator. The main motivation for many teachers to become coordinators might be personal. However, the administration tries to further motivate the rest through the exchange of participation in the program for merits that can, ultimately, improve teachers' working conditions as previously mentioned.

The ultimate addressees of the program are the students, who theoretically receive the information and the training within a teaching environment that supports environmental actions and through activities designed by the coordinators with the guidance of the Service of Educative Administration (*Servicio de Ordenación Educativa*), from the Provincial School Administration.



Figure 4-1. Main program actors and affiliated institution.

Source: Author

Implementation

The Aldea Program is the second most successful education program in the region in terms of participation. During the school year 2017/2018 it had a high participation, with 251 275 participant students in 995 schools (Consejería de Educación Junta de Andalucía, 2019, p. 11). Although these numbers are very impressive, I can relate from my experience that it is not uncommon to automatically register every student to the program regardless of the Action Plan to be developed.

The main design of the Aldea program stems from regulations created by the Regional Government, specifically from the guidance of the Educative Innovation Office of the Regional Office of Education and Sports (*Consejería de Educación y Deportes*). It drafts the frameworks, plans and guidelines for the possible activities with the collaboration of the Regional Environmental Office (*Consejería de Medio Ambiente*) and allocates the resources for each province.

The program currently has two modalities: Mode A and Mode B. Mode A corresponds to the participation in the Eco-schools' network. It is a comprehensive project that includes

environmental education from a holistic perspective, not only in terms of activities but also in terms of school operations and curriculum adaptation. To participate in this modality, schools must have been part of the Mode B for at least two years prior to the implementation of this modality and they are required to involve at least 50% of the teaching board in the program. This option represents a big leap forward towards the professionalisation of the program. Mode B requires less involvement from the teaching board and is structured in three different lines of intervention which are developed in three different projects each, as shown in Table 4-2. Each project in Mode B has a different goal and focus regarding pedagogical strategies. All the schools that participate in this study and the program belong to the Mode B.

Table 4-2. Aldea EEP lines of intervention and projects

	MODE A	MODE B		
Line of intervention	Eco-schools' network	Sustainability and global change	Biodiversity conservation	EE in Natural Spaces
Projects		Recapacicla (resource efficiency and waste management) Terral (Climate change) Eco-garden (Cultivation of edible vegetables in the school)	Seed (Development of a nursery of autochthonous trees in the school) EducAves (Study of local birds, resident and migratory) Pleamar (Study of coastal ecosystems)	Doñana (Study of the ecosystem of the natural park of Doñana) Sierra Nevada (Study of the natural park of Sierra Nevada) La Naturaleza y tu (visits in nature to understand local ecosystems)

Source: Dossier Aldea (Servicio de Planes y Programas Educativos & Servicio de Educacion Ambiental y Formacion, 2018)

As declared by School Coordinator 2, the Mode A has more stringent requirements and demands more work with few additional resources, which can be interpreted as a barrier towards participation among the potential coordinators.

“Eco-school is basically the project of projects. You need involvement of at least 50% of the teaching board, it is the biggest project and it is very exigent. [I have participated on it before and] I liked it less because it is very demanding. And they [the program’s staff] evaluate you in the school. I like these [Mode B projects] better because you have more freedom” (School Coordinator 2, Personal Communication, 2019).

This view is confirmed by the number of schools that participate in a modality or the other as stated by the *Responsable Provincial*.

“We could be talking of about 40 eco-schools in the province and about 80 developing the Mode B of the program” (Responsable Provincial, Personal Communication, 2019).

The decision to participate in the program can have three different origins: the staff decides to take part in it based on a vote during one of their first meetings of the year, one of the teachers in a school decides to undertake the challenge his or herself for personal or professional reasons, or the school senior leadership team offers it to a teacher, who is in the position to accept it or refuse it. In participant schools 1 and 2 it was the teachers who promoted it with a high degree of support and/or coordination with the leadership team, and for schools 3 and 4 it was a suggestion from the leadership team that started the process. School 5 rejected the participation to the EEP Aldea altogether in one of the faculty board meetings.

After the decision to participate is made, the school coordinators are supposed to determine a work team among their peers and all or some of the students, and then choose a minimum of 2 specific projects to participate. The projects chosen by the schools that have participated in the project are: Recapacicla, Terral, Eco-Garden, Seed and Educaves. Due to the geographical location of the schools, *Pleamar* (to be developed near the sea) and *Doñana* were not eligible. Table 4-3 shows the schools and projects they adhered to. The reasons stated to choose one project over the others were mainly available resources from school, which were determined with the collaboration of the leadership team or the work team, and personal preference, in that order. In addition to the resources available to each school, many of the contents and the materials for the development of the projects are provided by the Educative Administration Office, but there is a certain level of flexibility provided to the school coordinators to decide which activities to undertake and how to do them depending on their own preferred methodology and particular circumstances in terms of time, participants, materials and permits.

Table 4-3. Aldea Program projects per School

School	Project
School 1	Terral Recapacicla Eco-garden Seed
School 2	Recapacicla Seed
School 3	Recapacicla Educaves
School 4	Terral Recapacicla

Source: Author with information from School Coordinators 1-4 (Personal Communication, 2019)

The projects Eco-Garden and Seed require some infrastructure from the schools: Eco-Garden takes a space where students can have their own ecological vegetable garden, and Seed offers the chance to students to plant a number of autochthonous tree species. Some of the seeds are provided by the program. School 1 already had a vegetable garden, which was also used to offer a course on gardening to students, and space to plant more trees. They used this opportunity to create a botanical garden through the project Seeds. School 2 already had a vegetable garden and they used the project Seed to plant more species. Terral is the name of a well-known wind in the south of Spain, characterised by high temperatures and low humidity, which is the reason why it was used to name the project that addresses climate change. Its contents are very theoretical, and the administration can provide upon request some extra materials such as small solar panels and solar radiation meters. In-school training can be provided as well. This training is also available for Recapacicla, which is the project oriented towards material resource efficiency, mostly through sorting and recycling, but also including theoretical contents and activities about the waste hierarchy. Visits to sorting or recycling plants are available and encouraged, but it is up to each school to organise and pay for transportation, according to time and resource allocation from the school. This is also true for the project Educaves, intended to teach students about the importance and the characteristics of bird populations in the area, permanent or migratory. There is a chance to visit two nearby centres in the case of Granada as suggested by the program. School Coordinator 3, already a hobbyist in ornithology, used both visits during the school year. The *Responsable Provincial* is responsible for the implementation of the program in the province through the communication and provision of the available materials

to the school coordinators (Servicio de Planes y Programas Educativos & Servicio de Educación Ambiental y Formación, 2018).

Once the lines of intervention and projects are chosen, the school coordinators must write an Action Plan. This document is a plan of the activities that are meant to be implemented during the school year, their justification, the pace of the activities, the resources that are needed, the main actors and any information that would explain how the program is effectively implemented in his or her specific school. There is a rubric provided by the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) to guide school coordinators on how to write the plan (Junta de Andalucía, 2008). This action plan is sent to the pedagogical team which assesses the document and suggests improvement options. This is considered the first step of the in-house or formal EEP Aldea's evaluation process. However, the advice provided by the pedagogical team is meant as a suggestion, and therefore schools do not have the obligation to apply them to their action plan.

“When each school has written its action plan, the pedagogical coordination team evaluates it and returns it to the school, indicating the most positive aspects and those where it might be a little weaker. (...) Plans are evaluated, but this evaluation is not a test, it's a collaborative process (...) and the evaluation of the Action Plans that we do is precisely to help schools. It is left to the school's discretion to apply the suggestions or even to continue or not with the program.” (Responsable Provincial, Personal Communication, 2019)

After the Action Plan has been written, there is a first training session at a provincial level. Depending on the project in which the schools decide to participate, there are two or more of these training sessions. They are mandatory and a day long, which means that school coordinators have the obligation to be absent from their own classes to attend it. These sessions are designed conjointly by the Regional Office of Education and Sport (*Consejería de Educación*), and the Regional Environment Office (*Consejería de Medio Ambiente*) (Responsable Provincial, Personal Communication, 2019). There are talks from people who have expertise in environmental issues and education, and there is room for exchange of experiences among the coordinators. There is also an inverse evaluation process in which teachers can communicate their concerns to the *Responsable Provincial* and his team, be it in writing or in conversation.

For the rest of the school year, the School Coordinators must execute the planned activities, for which they can use the resources previously mentioned. They must attend all additional mandatory training activities and report the actual process and activities, program implementation, their thoughts and their conclusions in a final report. This is also a final program evaluation as well as self-evaluation, which requires the submittal of justification documents to prove the development of the chosen projects and a self-assessment made according to whatever indicators they had set in the action plan.

“The indicators are seen and measured from the action plan. We see how the students' participation is higher each year. This is the most important indicator that we have to see how the program is being developed.” (Responsable provincial, personal communication, 2019)

The goals of awareness and behavioural change are, therefore, not mandatorily nor objectively assessed. According to the *Responsable Provincial*, the process of pedagogical innovation requires a level of freedom that might enter in conflict with other more structured strategies for behavioural change: *“Although results are important, the path is almost more important, because of the educative innovation (...) The important thing is that we change the procedures of how we interact to each other.[...] There is no test”* (Responsable provincial, personal communication, 2019). This theoretical conflict might imply the reticence to implement a sophisticated assessment system

that would consider both awareness and innovation which could potentially increase the workload for the main actors involved in the program.

The representation of the intervention theory as explained above is depicted in Figure 4-2, where the arrows represent the flow of communication, resources and changes, and the boxes the institutions, actors or aspects that are related by the activities defined in the program. This process represents a yearly cycle. Therefore, each year some of the actors change and the flows need to start from zero.

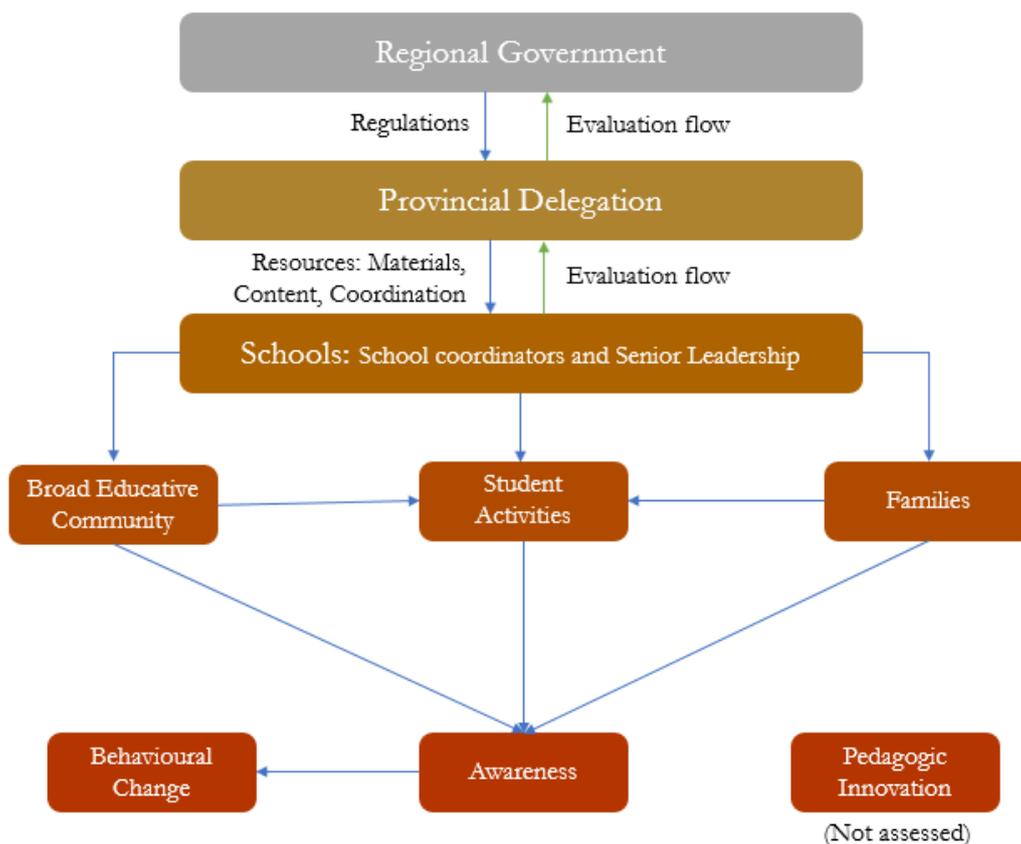


Figure 4-2. Intervention Theory of the Aldea Program

Source: Developed by the author based on the collected data

4.2 Impact Assessment

The literature review showed how important values and goals are in terms of activating personal norms and inducing pro-environmental behaviours, and the methodology section explained how these were included in the attitudes block. One of the main aspects required to interpret the results is the importance given to attitudes in the programs and how they are represented in the different schools, as predictors of behaviour.

4.2.1 Symptomatology: Statistical Analysis

The symptomatology of the EEP Aldea’s outputs and outcomes derives from the statistical results of the survey. The results are structured from general to specific; I first show the general results of the entire sample per block, assessed environmental aspect and purchasing aspect specifically, and per basic demographic aspects such as gender and family dynamics. A second part establishes the differences between Aldea and non-Aldea participant schools and considers

if such differences are statistically significant. A third and final part addresses specific scoring per school.

The original sample of 249 respondents has been reduced to 246 because three of the initial records proved problematic. One of the respondents failed to identify his or her school and wrote the class group instead, therefore making it impossible to allocate the answers to other than the general group. A second was a literal repetition of the following one, meaning that they were submitted seconds apart and the open-ended questions had exactly the same words in the same order, which I understood it is the same record submitted twice. A third response was corrupt because all the fields were blank. A bootstrapping analysis of the school where the record belongs showed a high level of distortion on the analysis due to the presence of this record, and therefore the decision of removing the individual was made.

General Results

As main overall takeaway from the general survey results, respondents are more eager to see changes and implication from society and themselves towards a higher level of environmental protection than to learn about those changes and to carry those changes out themselves. Attitudes score is higher than knowledge and behaviour scores.

The quantitative responses to the survey are aggregated in different forms, as explained in section 3.3.2. A first level of aggregation groups indicators within three main blocks: behaviour, knowledge and attitudes, each block with its own score. Each block corresponds with one of the first three sections of the survey: What I do (behaviour), what I know (knowledge) and what I think (attitudes). Those blocks are also aggregated to a general score. A second level of aggregation groups the indicators in different aspects within one block as can be shown in Table 4-4. Therefore, each aspect is related to only one of the blocks. This second level of aggregation in aspects allows for a higher level of granularity. Appendix 2 shows what indicators and questions relate to which aspect.

Table 4-4. *Analysed aspects and corresponding blocks*

Aspect and corresponding block
Water consumption (B)
Energy consumption (B)
Chemicals consumption (B)
Waste consumption (B)
Purchasing: Clothes (B)
Purchasing: Electronics (B)
Purchasing: Food (B)
Water pollution (K)
Biodiversity loss (K)
Water depletion (K)
Climate change (K)
Solid waste (K)
Society (A)
Individuals (A)
Politics (A)
His/herself (A)

Source: Author

The mean results for the entire population of the study are displayed in Table 4-5 and Table 4-7 below. Every environmental aspect assessed in the survey is related to either Knowledge block (K), Attitudes block (A) or Behaviour block (B). On Table 4-5 we can see that Attitudes is the block with the higher average score, followed by knowledge and behaviour. The gap between Attitudes and Knowledge is 5% in relation to the attitudes block whereas the gap between Knowledge and Behaviour is 18% in relation to the knowledge block. If we take a look at the distribution of each of the blocks on Figure 4-3, we see that they don't follow a normal distribution. Behaviour has a clear positive skew, which means that the respondents tend to have lower scores than the normal distribution, Attitudes clearly skews negatively and Knowledge is not only slightly negatively skewed but is also clearly leptokurtic, meaning that results tend to be more frequent towards the middle of the curve.

Table 4-5. Mean Scoring per Block

Block	Mean
Behaviour (B)	2.72
Knowledge (K)	3.21
Attitudes (A)	3.38

Source: Author

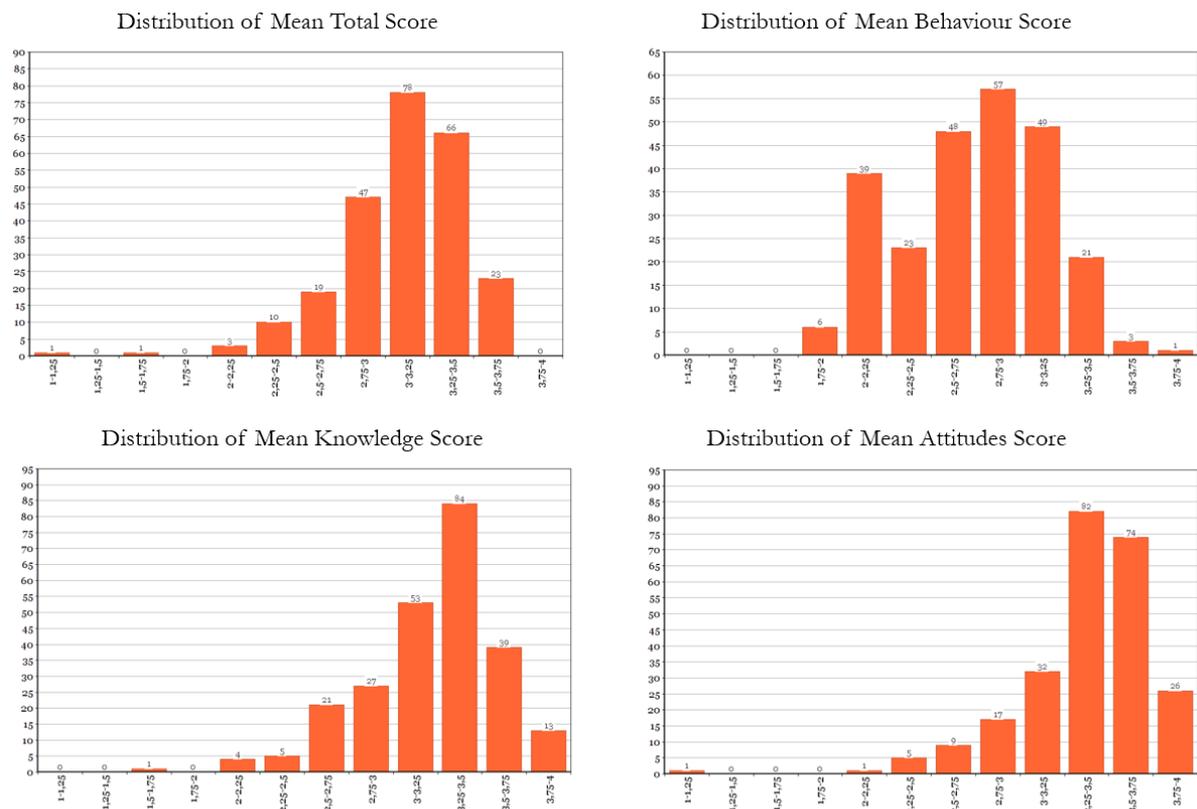


Figure 4-3. Distribution of mean scores for each block and the total score.

Source: Author

Figure 4-3. Distribution of mean scores above shows the distribution of the respondents scores per block and in the general mean of the scores. These scores are distributed between one (1) and four (4) according to the chosen Likert scale. One is the lowest possible pro-environmental

value and four is the highest. The general mean score of the survey’s frequency distribution curve has negative skew, meaning that most of the respondents had higher scores than the middle possible value, which by definition of the scale is 2.5. There are some outliers at the lowest end of the scoring but other than that we can consider that the vast majority of respondents scored two or higher.

Table 4-6 shows the Pearson coefficient r between the three aspects to see if there is any indication of relationship between Behaviour, Knowledge and Attitudes. The Pearson coefficient shows the correlation between two aspects or variables, ranging from +1, where the increase of one variable is related to the increase of the other in the same proportion, and -1, whereas the increase of one variable is related to the decrease of the other in the same proportion. 0 would indicate no relation between the different values of the variables.

Although the correlation in the three pairs is weak, the significance is over 99%. The weakest correlation is established between Behaviour and Knowledge and the strongest between Knowledge and Attitudes. It is commonly understood that Knowledge is to a certain extent required to create awareness, but our results indicate that there might be more effective mediators in the process for Behavioural change, in line with Mcguire (2015). In any case, the correlation study also shows that there is a correlation between the Purchasing sub-block and the main blocks, also of a significance over 99%. The highest correlation is with the Behaviour block, which is understandable because purchasing is part of it.

Table 4-6. Pearson coefficient between the different blocks

Behaviour-Knowledge	0.49
Behaviour-Attitudes	0.55
Knowledge-Attitudes	0.59
Behaviour - Purchasing	0.39
Knowledge - Purchasing	0.32
Attitudes – Purchasing	0.35

Source: Author

Table 4-7 shows the overall mean for each of the different aspects in which the indicators have been organised. The same scores are organised by number and by related block, behaviour (B), knowledge (K) and attitudes (A). From this information, I would like to point to the low scoring that behavioural aspects have in comparison with those related to knowledge and attitudes. The behavioural aspect with higher score was water consumption (3.57) which has the fourth highest score. Water saving has traditionally been an important environmental issue in the area due to recurring draughts. Water saving has been the target of many campaigns in the past decades and many strategies for savings have been communicated. The second highest scoring behavioural aspect, Energy Consumption (3.19, 10% lower), has also been traditionally the subject of many campaigns. However, the consequences of high energy consumption have rarely ever been consciously experienced by the respondents in comparison with water shortages, because power cuts are rare, but water service interruptions have happened at least nearby in the past years.

For the rest of the aspects, those related to knowledge are spread from the very top to the very bottom of the table, showing that there is a lot of disparity about sustainability knowledge; basic knowledge such as biodiversity loss, which are classic topics in environmental education contents of all levels, score very high, whereas more sophisticated aspects such as solid waste, which is a complex process that requires attention to details, score much lower. Attitudes such

as allocation of responsibilities to society and themselves score very high and explain the preponderance of the attitude block over knowledge.

Table 4-7. Mean Scoring per Aspect (ordered by mean score and by block)

Aspect ordered by score	Mean	Aspect ordered by block	Mean
Water pollution (K)	3.77	Water consumption (B)	3.57
Biodiversity loss (K)	3.63	Energy consumption (B)	3.19
Society (A)	3.62	Chemicals consumption (B)	2.82
Water consumption (B)	3.57	Waste consumption (B)	2.78
Individuals (A)	3.43	Purchasing: Clothes (B)	2.49
Water depletion (K)	3.3	Purchasing: Electronics (B)	2.33
Climate change (K)	3.25	Purchasing: Food (B)	1.52
Energy consumption (B)	3.19	Water pollution (K)	3.77
Politics (A)	3.1	Biodiversity loss (K)	3.63
His/herself (A)	3	Water depletion (K)	3.3
Chemicals consumption (B)	2.82	Climate change (K)	3.25
Waste consumption (B)	2.78	Solid waste (K)	2.17
Purchasing: Clothes (B)	2.49	Society (A)	3.62
Purchasing: Electronics (B)	2.33	Individuals (A)	3.43
Solid waste (K)	2.17	Politics (A)	3.1
Purchasing: Food (B)	1.52	His/herself (A)	3

Source: Author

As stated before, purchasing behaviours are among the aspects that scored lowest, leading to the notion that purchasing as a pro-environmental action is not acknowledged yet or that there are mechanisms (social, cultural or even economical) that keep respondents from a more sustainable purchasing behaviour.

To assess whether the environmental impacts of purchasing are known by the students, questions 18. “Eating meat affects climate change” (Mean score 2.38, 13% lower than the knowledge block, 3.21) and 19 “Generating waste does not matter because we can recycle it” (Inversed Mean score 2.21, 19% less than the knowledge block mean, 3.21) were included in the knowledge block (“What I know”) in the survey.

The assessment of the purchasing practices presents two different methods: the analysis of the questions that use a Likert Scale of 4 grades (General Mean: 1.92) and two questions related to electronics consumption, in particular mobile phones. These are questions 8 “How many months old is your current cell phone?” (Mean answer was 14.09 months) and 9 “How many phones have you had in the last 4 years?” (Mean answer was 2.26 mobile phones). Figure 4-4 shows the distribution of the answers for both questions. If we look at the frequency distribution curve for both questions, we see that Q8 seems logarithmic whereas Q9 is just highly irregular. Disclaimer: for this specific analysis, two outliers have been removed from each set of data. For Q8, two data points with value 72 and 183 months; the case of 183 months is because it is unlikely that a mobile phone that is over 15 years old is currently operative; in the case of the 72 months old, the respondent also claimed to have owned two mobile phones in the past four years and that he/she does not look for second hand items as first option. Although there is a chance that the 6-year-old phone has been passed on from someone else, I consider it unlikely at this point. For Q9, two data points of values 10 and 16 mobile phones because I consider it unlikely that a teenager can change a mobile phone every 3 or even every 8 months in a four-year period.

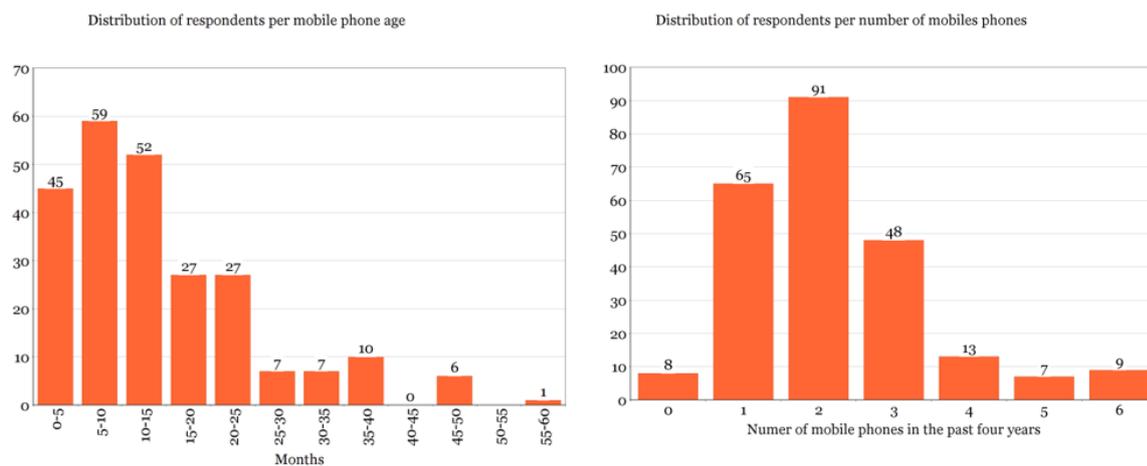


Figure 4-4. Distribution of Q8. How many months old is your current cell phone? and Q9. How many phones have you had in the last 4 years?

Source: Author

The correlation between the age of the phones and the number of phones is low (Pearson coefficient $r=-0.18$) but the sample has a significance of 99.5%. Therefore, although the correlation is low, the negative relation that we could expect, the fewer the phones, the older those tend to be, is supported. A reason why the correlation is not higher might be the possibility of some of the respondents being young, and therefore having received their first phone recently. That would balance out those that would show an older phone, which are the few, but this hypothesis would require validation.

When considering gender as a possible explanatory variable for pro-environmental behaviour as it is identified in some of the previous studies in Chapter 2, I have found that it seems that on average girls tend to have a higher pro-environmental score than boys as shown in Table 4-8, which aligns with previous findings. The means of the blocks have been calculated by gender. From the respondents, 51% self-declared as women and 49% self-declared as men. Some data points had to be excluded because they self-declared transgender in two cases, but not stating to what gender, and one respondent self-declared a unicorn, which was ruled out as corrupt information.

Table 4-8. Mean Scoring per Block and Gender

Gender	Behaviour Mean Score	Knowledge Mean Score	Attitudes Mean Score	Mean Total Score
Men	2.69	3.11	3.29	3.03
Women	2.79	3.33	3.50	3.21

Source: Author

I have used hypothesis testing (T-test) to assess whether these differences in average are statistically significant or if there is a high enough probability of being affected by the sample in a way that would undermine the hypothesis validity, which, in this case, would be that girls have higher pro-environmental traits than boys. This hypothesis is not part of the research questions and the term is used solely in the present exercise to assess the validity of the claim. The T-test

has been designed with a 95% of confidence interval about the mean and the critical value of t is 1.96 considering the sample size. The results are shown in Table 4-9.

Table 4-9. T-test results. Gender.

	Behaviour	Knowledge	Attitudes	Total
t	1.79	4.44	4.13	4.18
Critical value of t	1.96	1.96	1.96	1.96

Source: Author

The results obtained show that the value of t is higher than its critical value for Knowledge, Attitudes and the Total, but not so for Behaviour. The conclusion of the test is then that the higher score of girls is statistically significant in the Knowledge and Attitudes blocks, as well as the Total score. However, the T-test results states that the average difference is not statistically significant in the case of Behaviour and that the scoring differences could be due to sampling.

Another aspect that seemed of interest considering the relation between purchasing practices and teenagers was the Family Dynamics, but although some dynamics, pluralistic and laissez-faire, seemed to score higher on performance per blocks and overall, none of those values seemed statistically significant under the T-test with a 95% of confidence interval about the mean and a critical value of 1.96. Therefore, and according to the present results, the influence that the different family dynamics can inflict on the results are not statistically significant. One reason for this result would be that most of the respondents, a total of 77, declared that the same type of family dynamics: consensual. Therefore, the rest of the models had too few data points as to dismiss the variation in samples as causes of the differences in score.

Differences in performance between participant and non-participant schools

The sample of 246 individuals is distributed between 132 individuals that participated in the program and 114 individuals who belong to the control group and who attend schools that do not participate in the EEP Aldea.

As shown in Table 4-10, participant schools scored higher in every block and in the total except for the Knowledge block, where the control group scored slightly higher.

Table 4-10. Mean score per Block and Type of School

Type of school	Behaviour Mean Score	Knowledge Mean Score	Attitudes Mean Score	Mean Total Score
Control group	2.67	3.28	3.34	3.08
Aldea Participant	2.79	3.24	3.42	3.14

Source: Author

Using a 95% confidence interval about the mean, I undertook a T-test to assess the statistical significance of the differences between participant and non-participant schools. The results are shown in Table 4-11. Following the T-test, confidence of 95% around the mean and critical value of T being t=1.96, only the Behaviour block rejects the null hypothesis, therefore establishing that the differences between the Aldea participant schools and non-participant are statistically significant. For the rest, it is not possible to assert that participation or non-participation in the Aldea program has an effect on the scoring differences.

Table 4-11. T-test results. Type of school.

	Behaviour	Knowledge	Attitudes	Total
t	2.06	-0.75	1.62	1.03
Critical value of t	1.96	1.96	1.96	1.96

Source: Author

Table 4-12 shows the results of the surveys per Type of School and Aspect. Each of the aspects has been categorised by K (knowledge), A (Attitudes) or B (Behaviour):

Table 4-12. Mean Scoring per Aspect and Type of School

Aspect	Mean Aldea	Mean non-Aldea
Water Pollution (K)	3.77	3.76
Biodiversity Loss (K)	3.67	3.57
Society (A)	3.65	3.59
Water Consumption (B)	3.54	3.61
Individuals (A)	3.47	3.38
Water Depletion (K)	3.25	3.36
Climate change (K)	3.19	3.32
Energy Consumption (B)	3.26	3.11
Politics (A)	3.17	3.03
His/Herself (A)	3.04	2.96
Chemicals consumption (B)	2.98	2.63
Waste Consumption (B)	2.83	2.73
Purchasing: Clothes (B)	2.55	2.42
Purchasing: Electronics (B)	2.41	2.24
Solid Waste (K)	2.17	2.16
Purchasing: Food (B)	1.55	1.48

Source: Author

On average, participant schools seem to score higher in most aspects except for Water Consumption, Water Depletion and Climate Change. The relevance of this results has also been assessed using T-Test to confirm whether the highest mean score can be considered statistically significant. The test was conducted with a 95% of confidence interval around the mean and the critical value of t being 1.96. From the test conducted, only four aspects showed statistically significant average differences: climate change ($t=1.97$), chemicals consumption ($t=2.72$), energy consumption ($t=2.02$) and purchasing electronics ($t=2.28$). Climate change, which is the only one where non-participant schools score higher than participant schools and that has statistical significance, belongs to the knowledge block; whereas chemicals consumption, energy consumption and purchasing electronics belong to the behaviour block. For the rest of the aspects, the differences are not statistically significant and there is a high probability of differences of the means being due to the sampling process.

Purchasing practices, as a sub-block within the behaviour block, has been analysed independently. The mean score is low for both participant (2.25) and control group schools (2.08). However, the results of the T-test show that the difference is statistically significant, therefore pointing to the possibility that participant students might show higher pro-environmental purchasing decisions. If we look at the specific questions about electric and electronic devices, the main differences can be found in *Q14.I encourage my relatives to buy energy*

efficiency devices and machines (2.35 average for Aldea participants and 2.29 for non-participants), which implies nudging, and *Q16.If I want to buy a new cell phone or pc, I look for a device that is also easy to fix* (2.18 average for Aldea participants and 1.79 for non-participants). However, the rest of the indicators do not show significant differences.

To assess whether the purchasing results about electronics match with the specific information gathered about the cell phones, a comparison between participant and non-participant schools of the EEP Aldea has been undertaken. In this case, the averages show older phones and fewer number of devices in the last four years for the non-participant schools, which would counter the previous results. However, the results of the T-test do not reject the null hypothesis and therefore we cannot accept that the non-participant schools have a statistically significant higher pro-environmental behaviour than their peers, therefore not diminishing the results obtained from the other questions.

If we look at the specific questions about electric and electronic devices, the main difference can be found in *Q16.If I want to buy a new cell phone or pc, I look for a device that is also easy to fix* (2.18 average for Aldea participants and 1.79 for non-participants). However, as I have mentioned, the rest of the indicators do not show significant differences. The survey also shows that there are some respondents who do not have and have not had a mobile phone as of yet. They were four in the case of the non-participant pool of respondents and 5 within the participant pool, which also shows limited differences between both groups and a limitation regarding the ages at which teenagers are provided with such devices.

Finally, a specific issue has been raised after the data analysis. From all the respondents that are supposed to be participants in the program, only a 31% was aware of such participation and replied YES to *Q50. Are you a participant of the program Aldea?* The rest replied No or left the question blank. Although the knowledge about the program itself is not part of the main explicit goals of the program, this result raises concerns about the effectiveness of some of the used communication channels and procedures and can ultimately be detrimental for the involvement of the wider educative community.

Results per school

In this section I display the means and distribution of the survey scores per block and school. Considering the varied size of the samples, as displayed in Table 3-1, it is difficult to assess whether the differences are statistically significant, even if it is possible to simply establish results through T-testing as done before. However, I consider important to establish these values as references for further development of the aspects contained in the rest of the analysis.

Table 4-13. Descriptive Values per Block

School	Behaviour			Knowledge			Attitudes			Total		
	Mean	Range	St Dev									
1	2.61	1.81	0.42	2.84	1.49	0.30	3.16	1.82	0.36	2.87	1.46	0.29
2	2.59	1.89	0.41	2.79	1.82	0.40	3.26	1.64	0.37	2.88	1.43	0.34
3	2.74	1.69	0.41	2.92	1.82	0.37	3.34	1.36	0.40	3.00	1.47	0.33
5	2.45	1.46	0.38	2.84	1.73	0.36	3.08	1.45	0.31	2.79	1.14	0.28
6	2.57	1.54	0.44	2.88	3.64	0.50	3.24	2.64	0.47	2.90	1.99	0.41

Source: Author

Table 4-13 above shows the descriptive variables per block and school: mean, range and standard deviation. The highest values for each of the variables per block are highlighted in the table. From this variables we can obtain two preliminary conclusions: on one hand, the highest mean score from all the blocks has been obtained by one of the participant schools, School 3; on the other hand, the dispersion variables show that the scoring is distributed more broadly in the control group, especially in School 6.

If we pay particular attention to the purchasing behaviour scoring on Table 4-14, which includes purchasing decisions regarding clothing, food and electronics but that does not include the purchasing and use of mobile phones specifically, we obtain, yet again, a higher score for School 3.

Table 4-14. Descriptive analysis of Purchasing Behaviour

Purchasing Behaviour (clothes, food, electronics, but no specifics on mobile phones)			
	Mean	Range	St Dev
School 1	2.18	2.20	0.59
School 2	2.20	2.40	0.50
School 3	2.49	1.60	0.49
School 5	1.96	2	0.50
School 6	2.27	1.80	0.49

Source: Author

These results reinforce the previous analysis about the differences between participant and non-participant schools, and the small correlations that can be found between the slight differences in mean values.

4.2.2 Educative Community involvement

The involvement of the wider Educative Community has been assessed mainly through the information obtained from the interviews and the action plans, but some findings were also derived from the students’ responses of the survey.

The survey identifies a variety of sources of environmental information in addition to the school. Schools are important sources for less than a half of the respondents, a total of 95 out of 246, similarly spread between the participant schools and the control group. This variety of sources makes it difficult to assess whether a potential impact is due to the EEP Aldea or to something else.

The three internal school documents analysed consider, at least on a theoretical level, the importance of the community involvement. However, only one specifies activities in which this involvement takes place; the collaboration of NGOs to collect used kitchen oil and toys, the first for recycling and the second for donations (School 2, Final Report on Aldea Program, 2019).

However, once we dive into the personal communications the activities that involved the wider Educational Community increase.

When considering parent involvement, School 1 Coordinator (2019) states the collaboration of parents with the program happened in two ways: a direct activity in which one of the fathers built a composter, and several indirect involvements, such as commenting to her peers about the program and raising awareness on their kids. According to the interviewee, these are the cases for parents who are already aware on environmental issues, and therefore general collaboration was not the rule. That was a shared view amongst all the school coordinators: parent involvement is difficult.

“[...] it is difficult to get parents to participate, because they have other issues to attend and it is difficult to get them involved a lot, or even at all” (School Coordinator 3, Personal Communication, 2019)

The neighbourhood in general was less involved in the projects. Except for the case of School 3 Coordinator, who had the collaboration of a neighbour who bred birds and whom he had personally acquainted long before the program, and some seeds that School 2 received, the rest declare that there has been no involvement. The main causes stated for this lack of involvement in the analysed cases were social factors and lack of communication.

The social factors identified were the size of the town, where more close-knit communities tend to be more involved but as cities are more loose-knit, involvement becomes harder (School Coordinator 2, Personal Communication, 2019), and parents' employment, which can undermine parent participation if they have long working days (School Coordinator 3, Personal Communication, 2019).

The communication aspect is related to the time required to publicise a program to different audiences. Some school coordinators do not have the time to effectively reach all the intended audiences and sometimes this lack of information falls on the neighbourhood sector (School Coordinator 4, Personal Communication, 2019).

Municipalities were declared to be open to offer activities and collaborate with the students. The relationship between those activities and campaigns for a broader audience in the case of the municipality of Granada has not been considered, nor identified. School 2 coordinator claimed that municipal involvement is common in different municipalities and School 1 claims to have identified differences between this year's involvement and previous ones.

The efforts that the program administration puts into wider community involvement are limited. According to the *Responsable Provincial*, that is a responsibility held by the schools and the program coordinator or team:

“This is a job for the schools (...). It is the schools who have to see what organizations or entities they will be developing their program with. Schools are intended to be autonomous; they are not told who they must talk to” (*Responsable Provincial*, Personal Communication, 2019)

If we compare this information with the results of the survey, we can see that participant schools have had similar engagement with the community, very low in all cases, and that there is a high variability of results in some blocks, similar to the control group (Schools 1 and 2). Therefore, it is difficult to obtain conclusions about this specific question based in the information shown by the data.

Another consideration of the broad educative community should be given to the uninvolved teachers. Some of the interviewees perceived that there was a small group of colleagues that actively participated in the program, but that aside of that small group there was little general participation (School coordinators 1 and 2, Personal Communication, 2019). In the case of

school coordinators 3 and 4, they declared little or no participation of their colleagues (Personal Communication, 2019). From the two surveys that I collected filled in by teachers in one of the schools, and which have been left out of the statistical analysis, we see that they do score higher than the average student of their school in every block. However, if we calculate the percentiles of their score in comparison with that of the students, we see that they are in percentile 95 in behaviour, 88 in knowledge and only 56 in attitudes. The percentile of the behavioural block is very high, 95, but if we extract from it only the indicators about purchasing practices, the score goes down to percentile 58. We can also argue that a third of the purchasing related questions can be understood either as pro-environmental behaviour or conservative financial planning, and potentially unrelated to pro-environmental traits. This ability to plan for expenses has been shown as one of the main differences between teenagers and adults in Chapter 2, because teenagers are still developing the aptitudes for it.

4.2.3 Contact with nature

Contact with the natural environment in the participant groups was rarely superior to the contact that students would have had if the school did not participate in the program, except for the School 3 which had two outings connected with the program *Educaves*. In fact, Schools 1 and 2 had both a vegetable gardens prior to the program, and their management was already part of their curricular offer. Had the schools not participated in the program, the garden course would have still been offered to the specific groups that took part in it (School Coordinators 1 and 2, Personal Communication, 2019). School Coordinator 2 stated that the site visits in nature were related to specific projects or lines of intervention that were not part of the lines of intervention chosen for this year. Therefore, the participation in the Aldea program did not necessarily imply an increase in contact with nature. School Coordinator 3 considers this lack of contact with the natural environment an issue that should be overcome in the future. The rest of the coordinators did not mention this aspect as a major issue for the success of the program. In the case of School 4, there was no contact with nature directly related to the program.

“We didn’t have any [activities in the natural environment] this year. Some students went to the vegetable garden, but we didn’t choose the project [intervention line] associated to outings” (School Coordinator 2, Personal Communication, 2019, [] added by the author)

“No [activities in the natural environment], we went around the block to study the different waste sorting containers, which is one of the recommended activities from the Consejería de Educación y Deportes [Regional office of Education and Sports]” (School Coordinator 4, Personal Communication, 2019, [] added by the author)

The analysis of the results of the three participant schools has been done through a t-test of the purchasing average score of School 3 against the rest, Schools 1 and 2, to see if the average scoring difference is statistically significant.

From the qualitative questions in the survey, I have conducted the analysis of the contact with nature and the outdoors in the students’ own free time, because the activities that included contact with nature in the program are very limited. The connection with nature was established considering the number of activities that students declared that take place in nature, whereas the relation with the outdoors is established by enumerating the number of activities that had to be done outdoors, in natural or urban environments. The study of the correlation between the scoring and the number of activities that students tend to do outdoor or in nature shows that there is no clear correlation between the contact with nature activities and the general scoring, the three main blocks scoring and the specific purchasing scoring. If anything, the behaviour block scoring shows a slight positive correlation with outdoor activities in their leisure time, but those do not necessarily happen in the natural environment ($p=0.20$).

School 3 scores 2.49 on purchasing behaviour in comparison with the 2.19 of the other two participant schools, as shown in Table 4-14. The statistical significance of this difference required testing. Therefore, t-testing School 3 against the other two participants was undertaken with a 95% of confidence around the mean. This test shows a statistical significance of the differences of the means ($t=2.71$, which is larger than the critical value of $t=1.96$).

4.2.4 Obstacles

The survey results suggest there might be some positive outcomes in terms of behavioural change in the schools that participate in the Aldea program in comparison with non-participant schools. In addition to this, all coordinators have had positive personal observations about sorting, cleanliness and energy saving habits such as turning off the lights before leaving the class. They also have very positive comments about the program and its implementation in general. However, results are far from perfect as we have seen in 4.2.1, and some obstacles to implementation have been identified in the interviews.

The role and conditions of the coordinator

As we have seen in 4.1.2, the coordinators are not professionalized for the specific tasks that they encounter as school coordinators of the program. The profiles are very varied in experience, both as professional teachers and as program coordinators, and as holders of relevant knowledge about environmental sciences and sustainability. Therefore, there are coordinators that are presented with a very steep learning curve when they first take on the role, whereas others do not. The Regional office of Education and Sports (*Consejería de Educación y Deporte*) acknowledges this fact and that is why there are training sessions during the year, some of which are mandatory and some of which are voluntary. In addition to that, there are internal communication platforms for the exchange of information among coordinators (*Responsable Provincial*, Personal Communication, 2019). However, the resources available for the new coordinators might not be clearly displayed or easily available considering the abovementioned learning curve and time availability.

“The School Coordinators come from all areas of studies. If you become coordinator without conviction and not knowing about the Environment it is really hard, because you get lost and do not know what to do.” (School Coordinator 2, Personal Communication, 2019)

“I can tell you that it has not been enough [training]. But we have rejected some optional training, and we could have had more training, but then we go back to the infamous loop (...) some training courses are in the afternoons (after classes) and due to work-life balance it is impossible for me to attend to a course in the afternoon-evening three days in a row” (School Coordinator 4, Personal Communication, 2019)

The contents of the training sessions are also viewed differently depending on the coordinator. However, there was a general agreement on the need to offer more time for sharing experiences among the attendants, so entry-level coordinators could learn from more experienced ones.

Finally, the requirement to attend to meetings seems to generate some resistance from some potential schools or coordinators, as mentioned by the Headmaster of School 5. The fact that the schools need to deal with the absence of a teacher for an entire day while he or she attends the training sessions and that this teacher would have to rearrange the teaching planning accordingly seems to disengage potential coordinators and school leadership boards from the participation in the program.

Program Design

Regarding the design of the program, several detailed obstacles have been identified. Although most of the interviewees responded positively to the overall design of the program, they identified some room for improvement in areas such as site visits for projects that are not directly related to the ecosystems particular to some lines of intervention.

“The program should offer more activities about outdoor actions with the students so we can share the experience with them [...] in the case of Recapacicla we had only one option to visit places” (School Coordinator 3, Personal Communication, 2019)

They also claimed that some of the materials that are provided for the development of the program are not well adapted for the age level. The clearest case is the materials for the *Recapacicla* line of intervention, which seemed to be developed for primary school students (School Coordinators 3 and 4, Personal Communication, 2019). It should be noted that this aspect was raised by the coordinators who were just finishing their first year. Considering that there is considerable room for the coordinators to organise alternative activities, it is likely that the standard materials are not used in the case of more experience coordinators or that they were modified to suit the needs of their pool of students. This adds to the importance of the professionalisation of the role.

Motivation

The responsibility and the level of involvement required by the coordinators demands much motivation from them to undertake these tasks. However, as explained before, there is little motivation from the Regional Office of Education and Sport, and only some of the teachers would be able to enjoy the currently offered incentives, since the ones that are more experienced and have more stable working conditions would see no improvement in their work life. In addition to that, the paperwork involved in the program disincentivise some people to engage in the coordination of the program, as expressed by the Headmaster of School 5. In fact, as the *Responsable Provincial* acknowledges, the success of the participation of schools and teachers is surprisingly high despite of the mentioned obstacles and points out to personal inclinations from coordinators to take part on the program.

“The good [interesting] thing is that here there is practically nothing for the coordinators, they just earn a certificate that gives them some tenths of points for the school allocation queue, that is why the success of the program is also so surprising, because all this effort is mostly altruistic, coming from personal conviction” (Responsable Provincial, Personal Communication, 2019, [] added by the author)

An important obstacle perceived by some of the stakeholders is the bureaucratic load. The different reports that need to be sent do not necessarily match the requirements established by the schools, and are perhaps even more stringent, therefore adding work while the program does not offer time to solve it (School Coordinator 2 and Headmaster School 5, Personal Communication, 2019). However, for School Coordinator 4, the issue is not so much about the amount of paperwork but about the deadlines in which these reports are due. They generally coincide in time with the submittal of other important documents related to the regular school development, such as grade reports.

“There is not too much paperwork, but it always comes in the worst time of the year, when you have to do many more things; but it is not excessive.” (School Coordinator 4, Personal Communication, 2019)

“Bureaucratic obstacles should be removed. That is all very well [bureaucracy], but schools that are in the capital city, where people [teachers] do not need to obtain merits it is only avoiding people’s involvement. (...) There is a

disincentive with all these hindrances.” (Head of School 5, Personal Communication, 2019, [] added by the author)

Time allocation

One of the issues that have been raised regarding coordination is the lack of time allocation for the involved tasks, not only for training and the realisation of activities, but also for planning. Some responsibility positions within the school system would entitle the person holding it to have fewer class hours to devote that time to the additional tasks. However, this is often not the case for educative plans. The *Responsable Provincial* claims that schools can provide that time even if it is not offered by Human Resources, therefore allocating part of the responsibility to the schools’ senior leadership. In opposition to this, from my personal experience it is arguable that schools are already understaffed due to the cuts in funding from the past years, and therefore removing lecture hours from a teacher’s schedule to have him or her involved in a program that is not mandatory should not be a priority. The *Responsable Provincial* also pointed to the fact that hiring more people could be a solution to this issue, not only in teaching roles but also in the administrative part of the program, so a better follow-up can be undertaken.

“I will be honest, I am coordinating this program but at a minimal level, because I am coordinating other three projects and I am swamped” (School Coordinator 3, Personal Communication, 2019)

“I think that what is needed is more human resources, because it is likely that we ask the schools to do many things, and perhaps we would have to equip them better so they can better work with the program. Same thing in Delegación, because to do the follow-up of so many schools is very complex.” (Responsable Provincial, Personal Communication, 2019)

Financial and other resources

Most activities have some related costs: these are time, which has been analysed already, transportation and materials. Although resource efficiency is clearly one of the main topics of this program, site visits, support materials and information sources may require some financial resources. In some cases, there is the chance to use the existing resources in the schools, such as computers and printers, but others require extra materials. Some schools obtain those resources from the general school budget for the year, but some others have no possibility to do so, therefore undermining the possible positive outcomes for the program.

“There is no budget, in some specific cases some teaching material. Economically nothing that can transcend [for the schools]. (...) When schools apply for the program, they can ask for in-school training or materials, and the Consejería de Educación y Deporte [Regional office of Education and Sports] distributes them according to its possibilities (...) but nothing that can make you think that the Consejería de Educación y Deporte [Regional office of Education and Sports], is extra-funding a school, because it is not” (Responsable Provincial, Personal Communication, 2019)

Some of the schools can have a negative balance, such as the case of School 4, and that eliminates the possibilities to engage in site visits and other activities. If a general allocation of funds to all participant schools is not possible, I would argue that a study of those schools which are in worse financial situation to face extra expenses, could categorise the schools in terms of eligibility for extra funding for specific Aldea program activities. As it has been previously discussed, site visits can potentially increase the performance of the program in terms of outcomes such as behavioural change.

5 Discussion

The discussion of the results paves the way to general conclusions of the research and more specific recommendations that stem from it. Each RQ is answered accordingly depending on the specific results that are relevant to it and including the reflections obtained from the literature review, considering whether they are aligned with previous studies and theories or not.

Q1. What are the stated and implicit goals of the Aldea program?

The normative approach to this question required me to take into account the definition of the program that has been chosen by the administration, the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) in this specific case, and the regulatory framework on which it is based. Therefore, I started by assuming that the aim of the Aldea program is that of the EE goal. A deep look into the Reference Theoretical Framework, the statements that stem from their own definition of the program and the claims made by different stakeholders show that the conception of the EEP Aldea's goals differs depending on the source of information. Therefore, a triangulation process among all of them has been necessary to reconstruct the program's intervention theory and its goals.

The theory that has been developed in the past years show the importance that our behaviours as consumers and buyers have in determining the changes that the planet undergoes due to human interaction, as shown in Section 1.1. EE is seen as a tool that policies can use to, ultimately, change behaviour to reduce said impact. Section 2.3 showed that educational tools for environmental protection and sustainability, and especially EE which is how the Aldea program is framed, should encourage people to consider a lifestyle that does not negatively impact the environment. This situation is all the more urgent considering the current rhythm of environmental degradation. According to the Reference Theoretical Framework, the program is defined as an EEP, and according to literature, environmental impacts are the most important issue in these programs. The Reference Theoretical Framework establishes that EE should have the conditions of providing problem-solving tools for the present and the future.

The program's Reference Theoretical Framework (*Marco Teórico de Referencia*) in which the Regional Office of Education and Sport (*Consejería de Educación*) bases the implementation of the program, establishes that the program is conceptually related to environmental education (EE), but EE goals are not explicitly addressed in the document. Sustainability is not mentioned in the goals as a concept, which means that we are before a program that conceptually focuses on "ecological justice" and that should have a more eco-centric view (Kopnina, 2012). One of the main references of this program, the Andalusian Strategy for Environmental Education (ASEE), recognises the need to "boost the adoption of pro-environmental behaviours", basing its claims in the United Nations Conference on Environment and Development that took place in Rio in 1992.

Meanwhile, the *Marco Teórico de Referencia* also recognises the importance of pedagogical innovation and Education for Sustainable Development (ESD), in a way that relates one to the other. ESD is indirectly brought in by the mention of the UNESCO Global Action Programme on Education for Sustainable Development, as part of the Agenda 2030 development, and the inclusion of pluralism as a pedagogical methodology. This relates directly to the idea of pedagogical innovation being a goal in itself, which is an aspect that is acknowledged in the ASEE but to which less emphasis is given. This view is emphasized by the *Responsable Provincial*, who insisted on the need for both, pedagogical innovation and pro-environmental awareness, at the same level. These references take the intervention further from EE and move it towards ESD without acknowledging the possible conceptual conflict.

In addition to that, school coordinators seem to have their own personal views of the goals for the Aldea program. Some of them, especially School Coordinators 1 and 4 (Personal Communication, 2019), emphasize the holistic nature of the program, also stepping outside a strict EE and entering the realm of ESD. This means that the goals of environmental conservation have to share the space with economic and social considerations, which could undermine the potential for environmental protection and conservation engagement as pointed out by Kopnina (2012). Whereas the school coordinators' perspective can be acceptable at a personal level, it does step out from the Aldea program's aims and its design. On the other hand, the emphasis placed on pedagogical innovation can justify and foster this vagueness in goals. This being the case, assessment and improvement of the program becomes very complex.

This goal conflict falls in what Vedung (2016) considers two important obstacles to any program stemming from the objectives: *goal indeterminateness*, due to the *vagueness* of the description of the goals, and *goal catalogues*, or the inclusion of more than one objective which can potentially conflict with each other. The fact that several goals coexist in the program, jeopardizes the options for what is supposed to be the main goal considering Aldea's conception as an EEP, which is environmental protection and conservation. This includes not only increasing the addressees' awareness, but also inducing behavioural change.

The complexity of the program is thus further increased by the vagueness of the goals and the conflict that may arise among them. First, it must be clarified whether the Aldea program is an EEP, where environmental aspects are prioritised and behavioural change is a goal, or an ESD program, where overall sustainability aspects are prioritized. Second, the goal catalogue should be addressed to resolve the potential conflict between environmental awareness and pedagogical innovation, because the latter is understood as incompatible with any objective and measurable assessment of the first one, as stated by the *Responsable Provincial*. The use of pedagogical innovation within the program should be clarified, whether it is a program that uses pedagogical innovation to address environmental or sustainability issues, or if it is a program aimed at pedagogical innovation that uses environmental or sustainability aspects as mediators for that end. In the last scenario, Aldea would not be an EEP or ESD program per se and would not be directly addressing the current societal needs to provide social tools to protect the Environment or foster Sustainable Development.

Q2. Does participation in the program Aldea have an impact on environmental knowledge, attitudes and behaviours, both in general terms and particularly in purchasing decisions?

According to the results from the survey, there are merely slight differences between participant schools and non-participant schools. Although participant schools do have a higher average score than non-participant schools, these differences are only statistically significant in the case of pro-environmental behaviour. This aligns with the overall results obtained by Olsson et al. (2019) in Taiwan, where they stated that the program had very limited results and not reaching the optimistic positive findings by Varela-Candamio et al. (2018), who found that several EEPs had positive results in terms of behaviour.

In fact, when analysing the aspects separately, the only ones that show statistically significant differences in average scoring are three behavioural aspects: (1) consumption of chemicals and (2) energy and (3) the purchase of electronic devices, without considering the number and age of mobile phones; and one knowledge aspect, climate change. The study group did score higher in the three behavioural aspects whereas the control group scored higher in the knowledge aspect. This higher score in just a knowledge aspect can potentially be aligned with specific personal or familiar interests, or even with the particular content of teachings from school. The results from the survey show that neither the socio-economic status considering the average

neighbourhood income, nor the family dynamics, as was suggested by Niu (2017), seem to affect the results in general. A deeper look at content of communication within the school system or even family interests could potentially provide insight in this dichotomy between the control group scoring higher in a knowledge aspect.

It should be noted that, as has been previously mentioned, evaluations of other EE and ESD programs (Boeve-de Pauw et al., 2019; Daniel Olsson et al., 2019; Thomas et al., 2019; Varoglu et al., 2018) are discrete in terms of units of analysis and time of study, and therefore it is difficult to generalise. The complexity of each embedded unit of study, of each EEP or ESD program, and each implementation prevents general claims. However, as results show, there are only slight differences in performance between the schools that participate in a program and the control groups. This could be due to a double problematic: the non-scholar context, family, friends and media, is more important than the school as mediator of behaviour regarding environment, and/or the programs present large areas for improvement. The weight of the mediators in pro-environmental behavioural change in teenagers, as presented by Flanagan & Gally (2014), presents a possible future area of research, so the focus can be placed on the more effective channels of encouraging said change.

The results of the survey also show that there seems to be little relation between the purchasing decisions and the rest of indicators. Family dynamics and peer pressure did not show a specific correlation at the moment of the survey, nor did the survey show any relationship between parental level of education and purchasing practices. Thus, the variation of scoring in the purchasing section does not relate to any other socio-economic indicator. A limited correlation between the scores of the blocks and the purchasing decisions point to the lack of activation of a social or personal norm about the act of buying.

In addition to the social activation, we should consider the influence of the lay theories that people, teenagers as well as adults, use to understand the world around them, assisting them in the decision making process, and which are directly related to the world around them (Flanagan & Gally, 2014) providing shortcuts to the definition of their identity (Flanagan, 2013). In conjunction with the search for identity and meaning in the world, the stage of brain development in teenagers primes immediate satisfaction before planning about the future (Lavecchia et al., 2016; Teffer & Semendeferi, 2012). This all feeds into the Dionysian trust which has already been identified as an important driver in consumption and that hinders personal norm activation towards pro-environmental decisions independently of the existence of knowledge about impact (Klintman, 2012).

Finally, the analysis of mobile phones in *Q8. How many months old is your current cell phone?* and *Q9. How many cell phones have you had in the past 4 years?* show a small but significant negative correlation with each other. This fact and the high number of potentially corrupt data points, as expressed in section 4.2.1, leads me to conclude that it would be interesting to consider the way the questions have been formulated and the possible misunderstandings that could have come from them. It might be helpful to ask deeper questions such as age in which they received their first mobile phone, if they “inherited” the devices or if they are the first owners of said phones, and similar, to get a clearer insight on the matter.

Q3. What is the relationship between the level in which the educative community is involved in the program and the behavioural outcome?

The literature review has shown the importance of community involvement in conservation behaviours. The importance of the context and the community that is part of it is acknowledged

by many researchers: Ostrom (2010) and the study of the local management of common pool resources, Flanagan & Gallay (2014) and the definition of the mini-polities that mediate behaviour for teenagers, and Kaur & Medury (2011) and the impact of media in teenager consumption patterns. It is also recognised in the training that the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) provides to the schools, whom they encourage to reach out to other members of the community, organisations and institutions, to design and implement conjoint actions for the program. In addition to that, social norm is an important driver to pro-environmental behaviour (Vandenbergh, 2005).

In relation to this last item, the finding of two surveys filled in by uninvolved teachers, and which were ruled out for the statistical analysis, show that their scores are not very high if compared with their school distribution in terms of attitudes and purchasing. This information elucidates how difficult it is to activate the social norm if part of the society that is supposed to rule by example is not being especially exemplary. This finding reinforces the suggestion of involving the entire community. To increase positive outcomes some of the interviewees stated that it is common that many of the uninvolved colleagues are completely unaware of the program itself, and therefore not benefiting from it.

Other than this, the case study does not shed much light on this issue, because the involvement of the community outside of the school has not been especially present in any of the participant schools. Therefore, this question remains to be answered, although I would recommend increasing the participation and its quality. This recommendation is not only motivated for the potential benefits to the students that participate in the program, as stated by much of the literature review and the fact that participant schools do not prove much further ahead in terms of performance, as shown in the comparative results between participant and control schools; I recommend this increase because of the potential benefits for the society in general and the normalisation of the pro-environmental awareness. Normalisation, as discussed in section 2.1, is one of the key elements, albeit non-necessary or sufficient by itself, for behavioural change.

Q4. What is the relationship between closer and more frequent personal contact with the natural environment and the program outcomes?

The results of the study have been analysed according to two different possibilities regarding contact with nature and the outdoors: (1) the self-declared variety of activities that students undertake in their free time, and (2) the activities programmed by the school coordinators. The information regarding students' free time has been collected through the survey whereas the data that corresponds to the program activities were obtained either by the Aldea program documents or the personal communications.

Survey results show no significant correlation between activities in nature or outdoors as self-declared by the students in general or specific scoring. However, School 3, which has had more contact with nature through two site visits related to the program has consistently higher means in every block than any other school, from both participant and control groups. Unfortunately, the differences in activities are not very important (the other participant schools had a vegetable garden where some students would work) and the possibility of other causes to the higher results cannot be ruled out. However, there are some leads that would support Otto & Pensini (2017)'s theory, which states that a contact with nature increases pro-environmental behaviour. There is a difference of 9% and 20% of the purchasing scoring between School 3 over the score of the other two participant schools. The T-test undertaken to evaluate the significance of these differences, with a 95% of confidence interval about the mean, show that the differences are statistically significant and therefore this possibility cannot be ruled out. Further research regarding this issue, perhaps with a larger number of participant schools and a longer period of

study, should be conducted to examine the extent of the claim that a higher level of contact with nature activates the personal norm towards purchasing decisions. Considering the findings on the case and the literature review, the difficulties that some schools find to realise the site visits should be seriously taken into consideration.

Q5. What are the key aspects of the program that could be improved to increase its performance on behavioural change?

As stated in section 3.2, the purpose of this evaluation is to merge the knowledge about the program and to improve its performance. Therefore, the designation of key aspects that could improve it is fundamental for the purpose of the evaluation.

First, formulating specific and tangible program goals has the potential to design the intervention theory with a clearer end, and therefore increase the logic of its processes. As stated before, the goals are not reflective of the full aim of environmental education considering the ASEE; there are two, environmental awareness and pedagogical innovation, which can conflict with each other, and the one related to environmental awareness is vague. Both issues, goal conflict and vagueness, can hinder both results and outcomes of the program (Vedung, 2009). The definition of the main goal of the program should reflect the Reference Theoretical Framework, avoiding vagueness and clarifying a hierarchy in the case of keeping two goals instead of one: awareness, which should refer to the need of behavioural change; and pedagogical innovation, which from the theory of EE should be clearly considered secondary and therefore used as means to obtain better results on the first one. The communication of said goal is fundamental, mostly considering that discrepancies have been identified between the goals of EE as stated in the program and the goals of the program as understood by some school coordinators. Although it can be argued that some level of vagueness is positive to identify unknown aspects and potential within the program, it is important to have a firm basis to build up a complex EEP implemented by many people in a large geographical area, as is the case of the Aldea program.

Second, communication of the program in general is clearly insufficient as it stems from the results: teachers have their own concept of what the program should be, and some students are unaware of their participation. They miss more fluid communication with each other, and the wider community is hardly ever involved. Communication among all stakeholders could potentially drive positive synergies and allow the development of a communal sense of responsibility, similar to the one related in Ostrom (2010), and the strengthening of shared lay theories and the notion of schools as mini-polities and mediating institutions for teenage development (Flanagan, 2013). These synergies could potentially facilitate the interaction with an even broader community, such as local companies, which is one of the shortcomings related by School Coordinator 1.

Third, the instability of many of the School Coordinators in terms of placement can be detrimental to the Aldea program's performance. If a higher level of stability was provided to the teachers who act as School Coordinators, preventing them from changing schools, for instance, under the condition of implementing the program, the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) could tackle different issues at once, from which we only relate those related to the program Aldea and not to the general educative functions. This stability could be motivated in less-desirable schools for the increase on available points for improvement of working conditions. The main advantages of this stability of the same School Coordinator in the schools are:

- Better coordinator performance due to avoided repetition of learning every year by the School Coordinator.
- Reinforcement of learning processes from one year to the next in students emphasizing the importance of environmental issues to promote long-term impact (C. Flanagan & Gallay, 2014). In fact, in schools where students have not yet undergone a preparation phase (Bell et al., 2016) that would lead them to a full profit from the EEP Aldea, the stability allows for the required time to reach that level .
- Easier follow-up on performance and identification of potential improvement measures.
- Continuity of contact with the community, increasing the options to a better involvement on the program's activities and a common approach to environmental issues (Ostrom, 2010).

Forth, and in addition to coordinator stability, the administration should plan to remove obstacles to participation in the cases where teachers do not need the offered merits. It is clearly difficult and consuming to develop a very broad and deep educational program without resources, so there should be increased in terms of:

- Financing: if schools cannot afford site visits, some urban students will not be able to enjoy site visits that would increase their connection with nature.
- Time: teachers have over 100 students distributed in several different courses, which diminishes the attention that Coordinators, themselves full time teachers, can devote to the program and that is required for a good implementation
- Relevant connections beyond other public administrations, because these contacts with companies or associations require time to develop.

Fifth, there are School Coordinators who emphasize the importance of sharing good practices with other Coordinators and the need for closer meetings with their peers from nearby schools. However, the *Responsable Provincial* insists on the existence of available platforms which they can use for that end. It is likely that more stability, clearer communications and more available time for the program, could overcome what seems to be a lack of information.

Finally, it also seems that the program's focus on content and knowledge is too strong in the development of the program and its materials. As it has been shown in section 2.1 Environmental behaviour and behavioural economics and the quantitative analysis (Section 4.2.1), a strong emphasis in content might not be key to develop the required pro-environmental behaviours. An affection-based approach, with a higher contact to nature and more experiential activities, in sum, teaching for sustainability instead that about sustainability (Daniel Olsson et al., 2019), could be more effective.

Figure 5-1. Suggested Program Intervention Theory Figure 5-1 below shows how the suggested improvements would influence the intervention theory of the Aldea program. Those changes are depicted as dashed arrows.

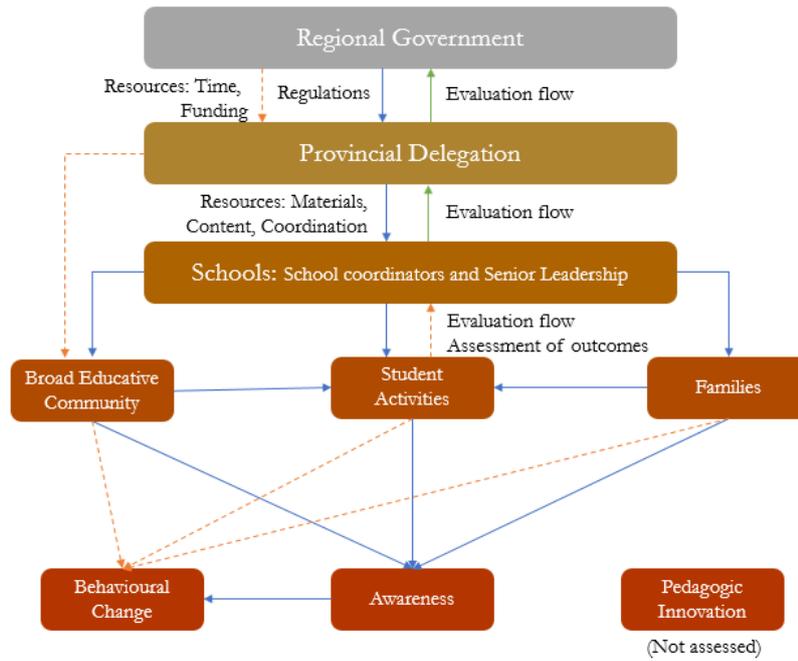


Figure 5-1. Suggested Program Intervention Theory

Source: Author based on Weiss (1997)

6 Recommendations

The main aim of this work was to evaluate the EEP Aldea in Andalusia for knowledge increase and improvement. The recommendations that are based on this research can be split into two categories, according to the distinction stated by Rogers (2007): theory and implementation. The category ‘theory’ addresses the suggestions on what modifications should be applied to the intervention theory. The category ‘implementation’ looks into what inside processes that aim at generating the expected outcomes according to the intervention theory can be improved, such as an increase on number of site visits per project to improve outcome and performance.

6.1 Theory evaluation

This part of the recommendation addresses the main points that the research suggests implementing to improve the program logic.

Clearly define goals

One of the first aspects to consider in the design of the underlying logic of a program is the setting of clearly defined goals. As stated in section 4.1.1, the current design of the program does not provide such goals. Therefore, it is important to, first, define whether the program will continue to be defined as an EEP, and only cover environmental issues, or if it will transition to an ESD program, and address general sustainability aspects. Then, policymakers should decide the hierarchical position of the pedagogical innovation goal in relation to the others. Considering the requirements of each of the goals, the results can conflict with each other and, as seems to happen, the pedagogical innovation goal hinders the definition of public standard indicators of the rest of the goals and an evaluation in terms of outcome and performance.

Explicitly recognise the importance of behavioural change

Behavioural change is an implicit outcome that is not addressed as such by the Aldea program. It is mediated by the outcome of “raising awareness” as a prelude to behavioural change. However, as it has been shown, behavioural change does not necessarily follow awareness, and there are options to address behaviour in a more direct way, such as activities that create a contact with nature, and from different groups, not only the school.

Regularly evaluate the program to facilitate continuous improvements

The clarification and definition of goals and outcomes could provide grounds to establish a process of evaluation for improvement, in which accountability is not considered but only strategies to increase performance. This process will require the definition of a set of standard indicators and the procedures to assess them. This evaluation should not substitute but complement the current channels of reporting that are in place to improve the program.

Establish communication with the broader educative community from the Provincial School Administration

The presence and performance of the program would benefit from a more institutional relationship with the broader educative community, such as companies and media. It would provide a more salient image and promote adherence to the activities, in addition to normalising the program and its goals.

6.2 Implementation evaluation

In addition to the logic of the program, the practice of the elements that are supposed to support the program need to be considered as well and improved for better performance.

Professionalise the coordinator role

The importance of the coordinator's experience is, as in many other occupations, fundamental. This professionalisation could be encouraged by the offer of avoiding geographical mobility for a certain amount of years with the condition of undertaking the program. Increase on the potential merits to be obtained by the program could also be an option.

In addition to that, the provision of more resources to the program seems to be one of the key factors for an increased motivation and better performance of the coordinators. The main resources that are lacking are time, understood as working hours that school coordinators and teams have to invest in the development of the program, and funding to increase the chances of schools undertaking activities that can improve the outcomes.

Swap the focus of the program from content to activities in nature

As we have already mentioned in the section 6.1 Theory Evaluation, it is important to recognise behavioural change as an outcome. This recognition should lead to the adoption and suggestion of activities that increase the potential of behavioural change beyond the communication of factual content as means to raising awareness. Some of the activities that have a higher potential in this respect are those that allow for direct contact with nature and the establishment of a connection with it. These activities should be defined for all the lines of intervention and increased in those cases in which they all exist.

The increase of resources would facilitate the adoption of said activities and, potentially, increase the outcomes of the program regarding behavioural change.

7 Conclusions

The EEP Aldea is a well-established program, and well regarded by many of the involved stakeholders. They consider it is a necessary program in light of the current environmental degradation and that it is overall well-designed. It has been operational for almost three decades during which it has had the possibility to undergo deep transformations and improve itself. As for any other program, there is room for improvement, which is the main objective of the present evaluation.

There have been two different criteria to approach the current evaluation: the study of the goals of the program through the reconstruction of the intervention theory and the analysis of the outcomes in terms of behaviour, knowledge, attitudes and purchasing practices of the main addressees of the program, the students.

The study of the goals shows that there is a conflict between the conceptual goals that correspond to an environmental education program (EEP), the explicitly stated goals, the Reference Theoretical Framework goals and the goals that are set in practice by some of the coordinators. First, it is unclear if the program is focusing on the environment, as an EEP, or if it has a broader objective, as in ESD programs. In addition to this, there is a pedagogical innovation goal that interferes with the idea of evaluation in terms of outcomes. These factors stand in the way of more agile and objective assessment of the current performance, leaving the evaluation process to school coordinators self-evaluations with no standard indicators. In fact, not even suggestions from the pedagogical innovation team are mandatory, thus the control over the outcomes of the program is very limited. Most feedback that the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) receives is in terms of personal appreciations. A clarification on the definition of the goals is highly suggested to improve implementation and follow-up.

Communication has potential to improve as well. The fact that the school coordinators have different views on the goals of the program from what the Regional Education Office states leads to the conclusion that internal communication between the Office and the coordinators is not very effective. It is remarkable that most participant students are unaware of the fact that they are participating in the Aldea program. Community engagement, which is very limited at this time and an important aspect of an EEP, requires better and more fluid communications, both from an internal and an external perspective.

The Aldea program's intervention theory does not explicitly address behavioural change, although it can be considered an implicit goal stemming from the Reference Theoretical Framework. Therefore, there is no evaluation process at this respect and no activities directly aiming for it. Most of the efforts are aimed at raising awareness through content, which seems insufficient to change behaviour both from the literature and the survey results. Some of well-acknowledged effective activities such as experiential actions and journeys to natural environments are not a fundamental part of the program's curriculum and no resources are available for them, thus preventing positive experiences for the development of pro-environmental behaviour.

In terms of motivation for participation, my conclusion is that the effort required to coordinate and participate in the program often surpasses the benefits offered by the Regional Office of Education and Sport (*Consejería de Educación y Deporte*) to the coordinators. The study revealed that many of the coordinators participate in the program out of a high personal interest in the subject. This means that many teacher would not participate in the program if they have just a moderate interest on the environment, unless some other incentives are provided. Some of these incentives could be resources in terms of time and funding for the activities. At this moment,

most of the program relies on the coordinators' enthusiasm, which also shows in the interviews undertaken. The time resources could be addressed in two ways: providing a reduction on the class hours that coordinators must give as teachers or providing more stability to those teachers that suffer from mandatory geographical mobility to avoid yearly learning processes that would delay the program implementation, and preclude the establishment of long-term projects. This is especially important in the case of participation in Mode B.

The results from the survey show the average score decreases from the Attitudes block, to Knowledge, to Behaviour, to Purchasing. The students that have filled in the survey were categorised in schools that participate in the EEP Aldea and schools who do not, which form a control group. The main result from the survey is that the differences between one group and the other are very limited. In fact, Climate Change, as an environmental aspect related to knowledge, even receives a statistically significant higher score from the control group, therefore suggesting that the program Aldea is not highly successful in terms of knowledge transfer. However, the small higher advantage of the study group in the Behaviour Block is statistically significant, which can be understood as a positive influence of the program, albeit small. With due consideration of methodological limitations, socio-economic aspects have not been found significant in terms of outcome, except for the fact that girls have significantly higher overall scores in the Attitudes and Knowledge Blocks.

Last, but not least, contact with nature seems to be an important aspect to be considered. School 3, which was the one that had outings in nature, was consistently the school with highest scores in all the blocks. The choice of project, in this case EducAves, which is about birds, partially motivated these outings. The Aldea program designs some of their lines of intervention to be in close contact to nature, but some others can be fully developed in a classroom. School 3 higher results in all the blocks aligns with the literature, in which experiences and contact and connection with nature have been identified as important mediators towards a more pro-environmental behaviour. Therefore, these activities should be primed.

Overall, the Aldea program is a complex system that requires big efforts from many different stakeholders, but especially relying on the school coordinators to deliver its value to the educative community in general and students in particular, which ultimately benefits the environment and society. The work that has been done in the past decades has served to the development of what the Aldea program currently is. However, I would like to use this thesis and its sets of recommendations to provide indications for further and faster improvement in terms of behavioural outcomes to set the foundations for a future that is currently in acute danger.

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Appendix 1: Survey questions

The environment and myself

Hello! My name is Alicia Requena and I would like to ask you some questions about your habits and your knowledge about the environment. The questions will be very simple, and you only need to answer as you believe or think things are. It is not a test. It is not graded. I just want to know more about how you are, so your honest answers will be enough. The results of this survey will be used in my Master thesis, but your personal answers will be completely anonymous. Not even I will know who you are.

In any case, if you want to know more about the project or your participation in it, you can visit the website <https://evaluacionprogramaaldea.school.blog/> . Thank you very much!

Let's begin! If you have any question, please ask the teacher in your classroom.

1. Name of school

What I do

This section will describe your decisions and habits. All questions can be answered within a range from “never” (1) to “always” (4) with some intermediate values.

2	I turn off the lights when I leave a room	1	2	3	4
3	I try to convince my parents/guardians to drive me to places	1	2	3	4
4	I close the faucet when I am washing my teeth	1	2	3	4
5	When I am washing something, I try to use as little soap or detergent as possible	1	2	3	4
6	I write on both sides of the paper	1	2	3	4
7	I try to replace things (clothes, cell phones...) when I find there are new models even if the old ones are still good to use	1	2	3	4
8	How many months old is your current cell phone?				
9	How many phones have you had in the last four years?				
10	If I have to buy something, I look for second-hand things first	1	2	3	4
11	I sort waste	1	2	3	4
12	I tell other people how to sort waste	1	2	3	4
13	If I am in the countryside and I see non-organic waste I pick it up and discard it appropriately	1	2	3	4

14	I encourage my relatives to buy energy efficiency devices and machines	1 2 3 4
15	If I am eating and snacking with my friends, I try to avoid meat	1 2 3 4
16	If I want to buy a new cellphone or pc, I look for a device that is also easy to fix	1 2 3 4

What I know

This section includes some questions about the environment. Answer with what you think is the best answer, remember, it is not graded! There will be questions ranging from “strongly disagree” (1) to “strongly agree” (4) with some intermediate options.

17	Climate change will influence our daily lives	1 2 3 4
18	Eating meat affects climate change	1 2 3 4
19	Generating waste does not matter much because we can recycle it	1 2 3 4
20	Fresh water is scarce	1 2 3 4
21	Species extinction can collapse an ecosystem, such as a rainforest or a sea	1 2 3 4
22	Climate change is produced by gases mostly emitted through burning processes	1 2 3 4
23	It is ok to throw lots of detergents and oil in the kitchen sink	
24	The sea has more fish than ever before	
25	A used pizza box goes in the blue container (paper and cardboard)	1 2 3 4
26	All living beings have functions that complement each other in nature	1 2 3 4
27	Cars emissions and flights are an important source of greenhouse gases and therefore a cause of climate change	1 2 3 4

What I think

This section is as personal as the first one. It will gather your opinions of different subjects and most questions can be answered from “strongly disagree” (1) to “strongly agree” (4) with some intermediate options.

28	Improving the environment requires action from everyone in society	1	2	3	4
29	There is nothing I can do as an individual to improve the environment	1	2	3	4
30	Individuals can influence how politicians act regarding the environment	1	2	3	4
31	I care about the environment and nature	1	2	3	4
32	Young people can influence what adults do in terms of environmental issues	1	2	3	4
33	Caring for the environment requires MY effort and sacrifice	1	2	3	4
34	Politicians have more important things to think about than environment				
35	I'm interested on politics				
36	Society needs to do whatever is needed to reduce greenhouse gas emissions	1	2	3	4
37	I feel bad if I see that nothing is being done to protect nature	1	2	3	4
38	We can live better if we care for our environment	1	2	3	4

Who I am and what my context is

In this section I will ask you about you and your family. Answer to the best of your knowledge.

39	Age	
40	Grade	
41	Sex	Female – Male -Other
42	Number of siblings	

43	Educational level of father/mother/guardian 1	(8 different options according to existing levels in Spain)
44	Educational level of father/mother/guardian 2	(8 different options according to existing levels in Spain)
45	The communication with my parents/guardians...	<ul style="list-style-type: none"> a. Does not exist, I do what I want b. They are strict, and they don't explain why. c. They are strict, but most times they explain why. d. Most decisions in the family are made through dialog.
46	I am independent to	<ul style="list-style-type: none"> a. Buy clothes b. Hang out with my friends for dinner or snacks c. Choose means of transportation for short commutes d. Buy stationery e. Other
47	When I am thinking of buying something, I ask my friends for opinions before my parents/guardians.	<p style="text-align: center;">(SD) 1 2 3 4 (SA)</p> <p>SD: Strongly disagree</p> <p>SA: Strongly agree</p>
48	My parents/guardians ask my opinion when buying something new (PC, car, holidays)	(Never) 1 2 3 4 (Always)
49	What activities do you do more often in your spare time?	<ul style="list-style-type: none"> a. Going outdoors with friends (camping, hikes, visit to a country house...) b. Going outdoors with family (camping, hikes, visit to a country house...) c. Having a walk around town d. Going to parties e. Movies and snacks f. Other
50	Are you a participant of the program Aldea?	YES – NO
51	Where did you learn or have you heard about the issues that have been raised in this questionnaire?	

Appendix 2: Environmental aspects and related indicators, questions in the survey and other studies where the same indicator appears.

Aspect	Indicator	Questions	Studies where this indicator appears
Biodiversity loss	Understand relations between elements of the ecosystem	21	
Biodiversity loss	Knows approximately current state of biodiversity	24	
Biodiversity loss	Understands concept of ecosystem	26	
Biodiversity loss	Understand relations between elements of the ecosystem	26	
Climate change	Understands climate change influences our world and will affect our lives	17	CIS (2010)
Climate change	Understands the relation of meat production and climate change	18	
Climate change	Understands relation between fossil fuels and climate change	22	CIS (2010)
Climate change	Understands relation between fossil fuels and climate change	27	CIS (2010)
Communication of program	Knows if he/she participates in the program	50	
Communication of program	Learnt about environmental issues on internet	51	Olsson (2017); Varela-Candamio et al. (2018)
Communication of program	Learnt about environmental issues at the program/school	51	Olsson (2017)
Consumption: chemicals	Tries to use little soap and detergent	5	
Consumption: energy	Turns off lights when leaving a room	2	Otto & Pensini (2017)
Consumption: energy	Tries to walk/bike/take public transport if possible/independent for that	3	Olsson (2017); Otto & Pensini (2017); CIS (2010)
Consumption: waste	Tries to use as little paper as possible	6	Varela-Candamio et al. (2018); Otto & Pensini (2017)
Consumption: waste	Tries to use things for as long as they last or gives them a second use	7	Olsson (2017); Varela-Candamio et al. (2018)
Consumption: waste	Tries to use things for as long as they last or gives them a second use	8	
Consumption: waste	Tries to use things for as long as they last or gives them a second use	9	

Consumption: waste	Feels it is ok to "inherit" clothes and other items	10	
Consumption: waste	Sorts waste at home	11	Olsson (2017); Varela-Candamio et al. (2018) Otto & Pensini (2017); CIS (2010)
Consumption: waste	Encourages relatives to sort waste	12	Otto & Pensini (2017)
Consumption: waste	Picks up waste when he/she sees it in a natural setting	13	Olsson (2017); Otto & Pensini (2017)
Consumption: water	Closes the faucet while washing teeth	4	Olsson (2017)
Demographics	Gender	41	Olsson (2017)
Demographics	Education level of parents	43	
Demographics	Education level of parents	44	
Family dynamics	Family dynamics	45	Moschis & Moore (1979) (not a study)
Family dynamics	Independence to buy clothes	46	
Family dynamics	Independence to buy food when hanging out	46	
Family dynamics	Independence to commute as wanted (instead of being taken by parents everytime)	46	
Family dynamics	Purchasing decisions made considering what parents value	47	Kaur & Meduri (2011)
Family dynamics	Opinions are asked at home before buying something	48	Kaur & Meduri (2011)
Family dynamics	Opinions are asked when going on holidays	48	
Family dynamics	It is common for the family to go in nature for weekends, holidays, etc	49	Otto & Pensini (2017)
Family dynamics	Knows about environmental issues from home	51	Olsson (2017); Varela-Candamio et al. (2018)
Him/herself	Cares about environment	31	CIS (2010)
Him/herself	Is interested in politics	35	
Individuals	Considers that individual effort is required to improve environmental conditions	29	Olsson (2017); Cheng & Monroe (2012); CIS (2010)
Individuals	Is ready to make an effort to improve the environment	33	
Politics	Feels empowered to influence politics	30	

Politics	Thinks that politics have a responsibility to act regarding environmental issues	34	Olsson (2017); CIS (2010)
Purchasing: clothes	Has no problem using old or second hand clothes	10	Olsson (2017)
Purchasing: electronics	Tries to change them as little as possible	7	
Purchasing: electronics	Has no problem using old or second hand electronic devices	10	Olsson (2017)
Purchasing: electronics	Encourages parents/tutors to buy high efficiency, environmentally friendly electronics	14	Otto & Pensini (2017)
Purchasing: electronics	Aims to buy easy-to-fix electronics	16	
Purchasing: food	Limits the consumption of meat	15	
Social norm	Purchasing decisions made considering what peers value	47	
Social norm	It is common for them to hang out in natural environments	49	Otto & Pensini (2017)
Social norm	Learnt about environmental issues through friends	51	Olsson (2017); Varela-Candamio et al. (2018)
Society	Thinks that environmental issues should be addressed as society as a whole	28	Varela-Candamio et al. (2018)
Society	Feels that young people as them can exert a positive influence on what others do regarding environmental issues	32	
Society	Feels that society should be moving towards reduction of air emissions, especially GHG	36	
Society	Feels frustration when society/politicians do not address these issues	37	
Society	Thinks that society will improve if we care about the environment	38	
Solid waste	Understands the importance of the hierarchy reduce-reuse-recycle	19	
Solid waste	Knows what materials can be recycled and how to dispose them	25	
Water depletion	Knows there is a risk of running out of fresh water	20	Olsson (2017)
Water pollution	Knows domestic sources of water pollution	23	

