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The Effect of a Special Featured Text on Students' Consciousness of the Consequences of Plastic Garbage in a Developing Country

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A Field Study in San Juan del Sur, Nicaragua

Thesis for Bachelor of Science

in Psychology

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Abstract

In Nicaragua the natural environment and the health of the people suffer from the high garbage consumption and polluting garbage removal (garbage incineration). Especially plastic garbage is dangerous for people's and animals' health.

This study focuses on the research question "Can students' consciousness of the risks of plastic garbage in San Juan del Sur be raised by reading a special featured text?" The results of a literature review shows that pro-environmental consciousness can be raised, by taking into account different theoretical concepts, such as one's own well-being and kin altruism, the 'Model of pro-environmental behaviour' and the theory of well-being and sustainable pro-environmental behavior.

Based on these findings a special featured text was developed in order to improve peoples' consciousness and a questionnaire was created in order to measure the consciousness. Twenty-four students (8 – 14 years old) from two different schools in San Juan del Sur were divided into the experimental and the control group. The consciousness of the students was measured by a pretest, post-test (after the students in the experimental group read the special featured text, respectively after the students in the control group read a short story about three bears) and a follow-up test after four weeks. In order to analyze the data, the Mann-Whitney U test was used to measure the difference between the experimental and the control group

The study found that the special featured text increased the students' consciousness of the influences of plastic garbage in general and of burning plastic garbage on people's and animals' health, in short-term. But it is not clearly proved that the special featured text increased the students' consciousness of the influences of plastic garbage in general and of burning plastic garbage on people's and animals' health, in short-term.

Key words: Nicaragua, health, plastic garbage, San Juan del Sur, pro-environmental consciousness, special featured text

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1. Introduction

Nicaragua is a Central American nation located between the Pacific Ocean and the Caribbean Sea. It is a developing country[1] and the second poorest country in Latin America, after Haiti. In the last years a rapid growth of the population has taken place. About 6 million people live in Nicaragua, whereas in 2000 the population numbered 5 million people (data.worldbank.org). The majority of the population lives in the Pacific, Central and North regions. Beaches and rain forests form a beautiful landscape and are habitats for numerous plants and animals.

But the natural environment and the health of the people suffer from the high garbage consumption and polluting garbage removal in this country. Supermarkets and kiosks spread single-use plastic bags, in which people transport their shoppings home. These bags and other garbage are often left behind and line the roadsides and beaches. Many people toss their garbage out the windows of cars or buses. A high amount of plastic bottles, syrofoam and tetra paks are consumed in Nicaragua and are simply tossed in the environment (www.sdcoastkeeper.org). This can have bad consequences for the environment, e.g. animals could mistake garbage for their food and consequently get ill or die (Gregory, 1978). Some towns in Nicaragua have trash services, but only people living in town can benefit from them, providing that they pay for them. There are pick-ups driving along the streets with workers collecting the garbage from trash cans. The pick-ups transport the garbage to open dumps. People who live outside the town have to transport their garbage to the dumps on their own. People who do not want to pay or are not able to pay for the trash service sometimes put their garbage in private trash cans or steal the cans (www.retirenicaragua.wordpress.com; www.sdcoastkeeper.org).

One big problem is ‘backyard burning’. That means that people burn their garbage behind their houses. Some people make fires from trash in order to cook. They especially use plastic garbage, because it is easily flammable. But even at dumps the garbage is burned. The biggest dump in Nicaragua is called ‘La Chureca’ and is located in Managua. It covers over 4 square miles, where one thousand people, even children, work and live. They search for food, next to vultures, dogs and cows. People search for glass and plastic in order to sell or recycle it, while

[1] In developing countries most of the people have a low standard of living. People have less money and secure and not everybody has access to education. These are amongst other things reasons why they are also called “the poor”. The quality of healthcare is very bad in many of these countries and many people do not have enough food or drinking water (Narayan et al., 2000).

the garbage is burning all day (bataholavolunteers.wordpress.com; expertvagabond.com). The practice of burning garbage, on dumps as well as privately, is a problem in Nicaragua, because it causes heavy air pollution, which can increase the emissions of greenhouse gases that contribute to global warming (Desai, & Potter, 2011; Oliveira, & Rosa, 2003). Furthermore breathing in toxic fumes day after day can have bad impacts on both people's and animal's health, ranging from difficulties in breathing to cancer (Künzlia, & Tagerb, 2005). Especially people burning their garbage inside their houses experience health problems to toxic gases. Bruce, Perez-Padilla and Albalak (2000) emphasize that "exposure to indoor air pollution may be responsible for nearly 2 million excess deaths in developing countries and for some 4% of the global burden of disease" (p. 1495). Of course some problems could be fixed by the government. Introducing particular laws could improve the environment, e.g. a recycling law for plastic bottles. But especially the environmental behavior[2] of the people in Nicaragua plays a big role. One can ask: Why do people living in Nicaragua endure their degraded environment? Are they aware of their behavior against their environment and the consequences?

Mostly, people in developing countries are aware of the environmental problems and they understand the need for a cleaner environment. However, they often don't take action, such as personal actions or obligations of citizens, to improve the environment (Ziadat, 2010). Thereby the priorities, people have in their lives, play a big role. Especially people in developing countries have other important priorities in their daily lives to deem than the environment, e.g. priorities for feeding the family (Kollmuss, & Agyeman, 2002). Maslow's hierarchy of needs assumed that striving for higher-order needs (e.g. self-actualization) is only possible when lower-order needs (e.g. hunger) are satisfied (Gleitman, Gross, & Reisberg, 2010; McMahon, 2011). In order to raise pro-environmental behavior, the person needs to be aware of the environmental problems and the consequences of his or her behavior. It is the first step in understanding how they respond to or interact with their environment (Ziadat, 2010). Kollmuss and Agyemann (2002) present the 'Model of pro-environmental behaviour'. It emphazises that in order to raise pro-environmental behavior not only environmental knowledge, but also values and attitudes, together with emotional involvement make up a complex called 'pro-environmental consciousness' (Kollmuss & Agyemann, 2002; Poortinga, Steg & Vlek, 2004).

[2] The impact of one's own actions on the nature (e.g. waste consumption)

Based on these findings a field study in San Juan del Sur is conducted. A suitable teaching strategy is important to raise people's consciousness of the risks of plastic garbage. Due to lack of technical resources in San Juan del Sur, a text printed on a paper is chosen. Nevertheless, a paper-based text can have major advantages in comparison to other media. In order to reach the reader's understanding of the influence of his or her own behavior and peoples' and animals' health, the comprehension of the given information has to be insured. A paper-based text affords people to read passages again that they didn't understand and to go back to prior passages in the text, which can help them to compare and summarize information in order to understand the whole message of the text. Mangen, Walgermo and Brønnick (2013) did research on effects on reading comprehension of linear text on paper and on computer screens. Thereby they found that reading texts on paper leads to better reading comprehension than reading the same text on a computer screen. Furthermore reading on a computer screen can cause visual fatigue due to their emitting light and can lead to additional cognitive costs. In contrast, a paper does not include these impairments (Mangen, Walgermo, & Brønndick, 2013). In addition, the text should include special features, which help to grab peoples' attention, increase comprehension of the text and finally raise peoples' awareness. For example, in order to grab people's attention the text should have some special features in form and content, e.g. pictures and numbers and facts about plastic garbage.

The target group for the field study are children. Children can have big impact on the environment, they are 'the future of the world', which means that their behavior probably has influence on the world and the environment for the next 60 to 70 years. In addition, a child needs contact with nature. It is uniquely necessary for a healthy child development (Faber Taylor & Kuo, 2006). Furthermore children can build a sense of caring and connection to the place where they live, when they are taught about the positive aspects about their local environment (Haluza-Delay, 2001). There are different schools in San Juan del Sur, some of them are local and some of them are private. It is possible that some students have a low consciousness of the risks of plastic garbage, due to their prior education. In order to find out if a text can have impact on the consciousness regarding risks of plastic garbage of students, which consciousness was lower before, the following research question is formulated:

Can the consciousness of students with a low consciousness of the risks of plastic garbage in San Juan del Sur be raised by a special featured text?

In order to answer the research question three sub-questions need to be answered:

1. How can a text raise students' consciousness of the risks of plastic garbage in San Juan del Sur?
2. Can students' consciousness of the risks of plastic garbage be raised by a special featured text?
3. Can the consciousness of students with a low consciousness of the risks of plastic garbage be raised by a special featured text?

2. Theoretical Framework

There are different factors that can raise pro-environmental consciousness, which can be used to raise students' consciousness of the risks of plastic garbage. Therefore, different theoretical concepts are briefly outlined.

2.1 One's own well-being[3] and kin altruism

One theoretical concept explains that it is possible that people act pro-environmentally on grounds of their own well-being or of the well-being of their family, even if they have to invest something, like time or work. This happens, for example, when people try to ensure the health of their whole family. There is a biological theory, which indicates that people behave in such a way as to benefit genetic relative's chances of survival or reproduction at some costs to their own chances. The reason is that the individual who helps their relatives shares some genes with them. This is also called 'kin altruism' (Kollmuss, & Agyeman, 2002; Osiński, 2009).

If people can understand the connection between their environment and their own or their relatives' health they would be more likely to act pro-environmentally in order to improve their

[3] People can have different mental states. People experiencing well-being describe this state, for instance, as mental harmony, peace and also happiness (Narayan et al., 2000).

health (Kollmuss, & Agyeman, 2002). As mentioned before, the practice of burning garbage is very common. That means the people are exposed to toxic smoke that can cause illnesses. People do recognize short term effects of breathing in smoke, like coughing, but after breathing in fresh air for a while they feel better and consequently they do not stop burning garbage. It is important that they also make the cause-and-effect connection of their behavior in view of long term effects. If people could link smoke with illnesses, which appear, for example, after several years, people would be more likely to avoid this behavior in order to ensure their own and their relatives' health - of course only if they would have an alternative that is more environmentally friendly[4]. Therefore it is important to inform the people, so that they are more aware of the environment and as a result more likely to act pro-environmentally.

2.2 Model of pro-environmental behavior

Environmental education could be the first step into raising people's awareness of the garbage problem in Nicaragua. But someone, who is more environmentally educated, is not necessarily more likely to act environmentally friendly. In Figure 2 the 'Model of pro-environmental behaviour' is presented. According to this arrow external and internal factors influence each other and, ultimately, pro-environmental behavior.

An external factor can be, for example, the socio-economic status. One's socio-economic status does not influence one's environmental behavior directly. It is mediated by other factors. For instance, people can associate recycling with nuisance. If someone with high-income, living in a large house and benefiting from a curbside recycling program[5], needs to walk to the curb to put out the recyclables once a week, this person would experience less nuisance than someone living in a small house, where is no space to store the separated materials, and who must transport these materials regularly to a drop-off point. This could have the effect that people are less likely to behave pro-environmentally (Berger, 1997).

Also internal factors can influence pro-environmental behavior, such as knowledge about environmental problems. As mentioned before, people would be more likely to act pro-environmentally if they understand the connection between their behavior and the environmental

[4] Not harmful to the environment
[5] A curbside recycling program is a public transportation system in order to recycle waste

problems. This model shows that in order to raise pro-environmental behavior not only environmental knowledge, but also other aspects have to be taken into account (Kollmuss & Agyemann, 2002). Kollmuss and Agyemann (2002) emphazises that "we see environmental knowledge, values, and attitudes, together with emotional involvement[6] as making up a complex we call 'pro-environmental consciousness" (p.256) (Kollmuss & Agyemann, 2002).

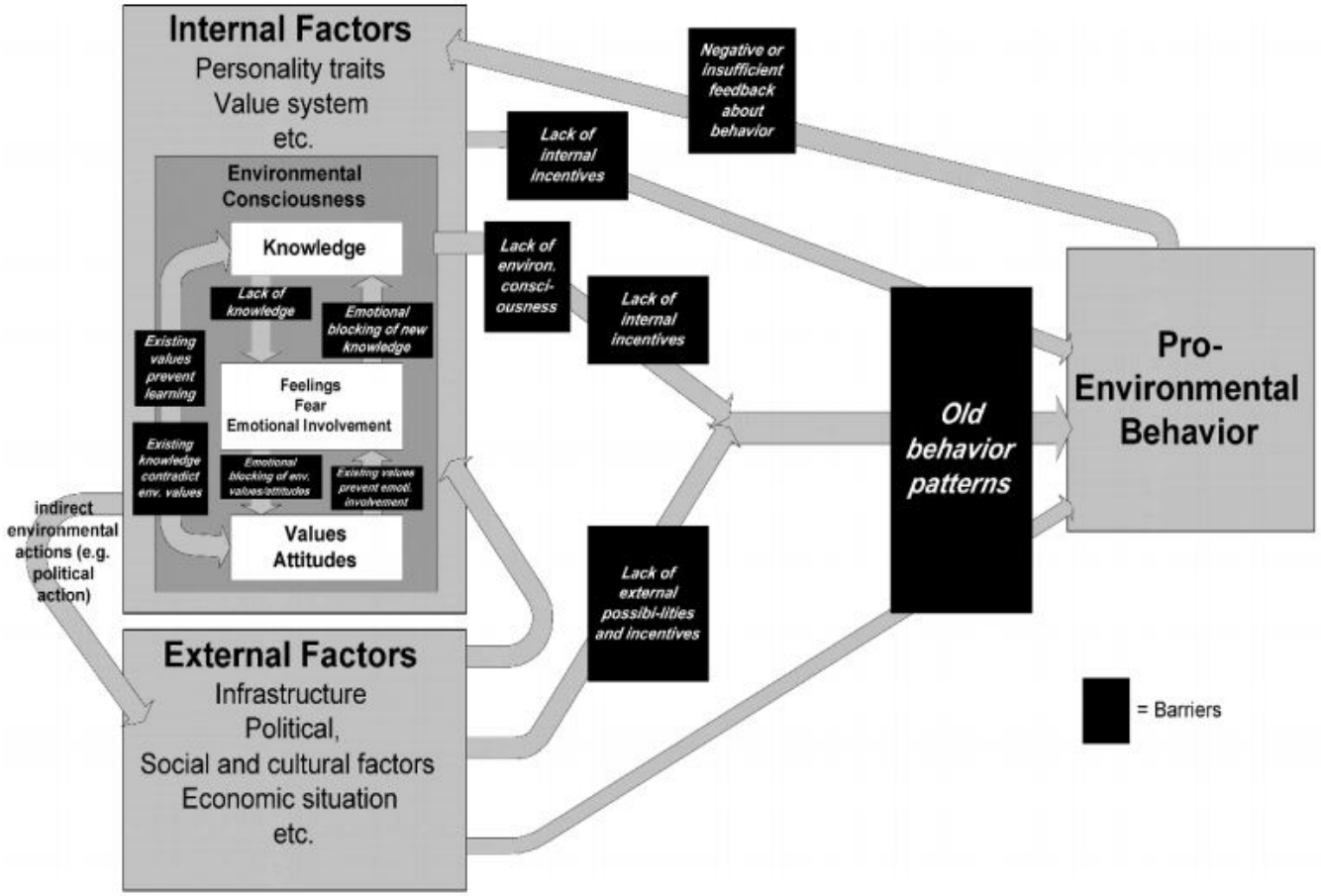

Figure 2. Model of pro-environmental behaviour (Kollmuss & Agyeman, 2002).

These findings are supported by Tonglet, Phillips and Read (2003). They did research on recycling behavior and made use of the 'Theory of Planned Behavior[7]'. According to them "(…) pro-recycling attitudes are the major contributor to recycling behaviour, and that these attitudes are influenced firstly, by having the appropriate opportunities, facilities and knowledge to recycle, and secondly by not being deterred by the issues of physically recycling (for example

[6] Describes the connection that someone has to the natural world. When someone is emotionally involved, he or she reacts emotionally to an environmental problem.
[7] A theory that indicates that the attitude toward the behavior, the subjective norm and the perceived behavioral control are predictors for the behavioral intention that can finally influence behavior (Ajzen, 1991).

time, space and inconvenience)" (p. 212). Further predictors of recycling behavior are a concern for the community, previous recycling behavior and the consequences of recycling (Tonglet, Phillips, & Read, 2004).

Environmental behavior cannot be explained by one variable, but is an interaction of many different variables. For example, in order to be emotional involved a certain degree of environmental knowledge is needed. When people see, for example, a picture of an oil-covered bird they mostly react emotionally. But people that are not aware of the cause and effect of this situation, can also be emotional non-involved (Kollmuss & Agyeman, 2002).

Furthermore keeping up values and beliefs plays an important role in our life. People strive for a state of cognitive consistency every time. This is one of the perhaps most basic human motives. If people act contradictorily, for instance if their personal beliefs aren't in accordance with their behaviors, they would feel uncomfortable because of the cognitive discrepancy between attitudes and behaviors. In a result they mostly change their personal attitudes or their behaviors in order to achieve consistency. For example, a man smokes, but he thinks that smoking is not good, because it is unhealthy, then he would try to minimize this discrepancy. The man would be poised for changing his attitudes or behaviors in order to achieve the state of consistency. He would think about stopping smoking or search for arguments, why smoking could be good for him, like 'If I smoke, I feel relaxed.' (Gawronski, & Strack, 2004; Kassin, Fein, & Markus, 2008).

Moreover, the locus of control[8] plays a big role in environmental behavior. The locus of control can be divided into the internal locus of control and the external locus of control. In general, people take their personal, behavioral capacities into account, before they behave in a particular way. For instance, if people should recycle their garbage in order to solve environmental problems, they estimate how difficult it would be to perform this behavior. If people think they can perform the behavior successfully, their internal locus of control would be very strong, because they feel secure about their own capacities. People with an external locus of control mostly feel that only powerful others could make a difference. They think that they couldn't change environmental problems. That means, if people should change their behavior,

[8] The locus of control describes how someone estimates his or her ability to change a situation through his or her own behavior.

they need to have a strong internal locus of control (Kollmuss, & Agyeman, 2002; Wiering, & Boer, 2012). Plastic garbage is used every single day, also by children. That means that they have a direct influence on the amount of plastic consumption. People and especially children, which may often feel powerless, should be aware of the fact that they can make a difference regarding plastic garbage problems and that this is not only an issue for influential people, like the government.

2.3 Well-being and sustainable pro-environmental behavior

In order to reach pro-environmental behavior in a sustainable way, people's well-being needs to be kept. When people act pro-environmentally they can have different states of well-being. These states are roughly divided into hedonic and eudaimonic well-being (Venhoeven, Bolderdijk, & Steg, 2013). The hedonic well-being describes the physical state of pleasure, but also cognitive preferences. That means watching a movie in a cinema, but also cognitively pleasant moments, such as getting a good mark in school, can contribute to hedonic well-being (Brdar, 2011; Venhoeven, Bolderdijk, & Steg, 2013). In general it can be said that, if people act pro-environmentally and they have to give up something, such as their modern life, their hedonic well-being could be threatened. For example if people should abstain from their car in order to reduce emissions, they have to release a little part of their modern life and they consequently feel bad about that.

On the other hand people can experience eudaimonic well-being. In contrast to the hedonic well-being, it refers to things that are intrinsically worth striving for, such as courage and being fair. The difference between the hedonic and eudaimonic well-being is that the hedonic well-being is more about having a good feeling and feeling pleasure at the moment and the eudaimonic well-being is more about having a good life. It can be said that eudaimonic well-being refers to a deeper and higher sense of well-being than the hedonic well-being (Brdar, 2011; Venhoeven, Bolderdijk, & Steg, 2013). Furthermore eudaimonic well-being can be linked to Maslow's hierarchy of needs. As mentioned before, Maslow believes that every person has the desire to move up the hierarchy toward a level of self-actualization. Also eudaimonic well-being is derived from fulfilling one's potential or true self. It implies that people strive for growth and they want to be meaningful (Brdar, 2011). If people, for example, act pro-environmentally, and

they feel that they want to perform the behavior and it is the right thing, their eudaimonic well-being would increase. That means that if sustainable pro-environmental behavior should be reached, it must be focused on the eudaimonic well-being (Venhoeven, Bolderdijk, & Steg, 2013).

2.4 Special features that the text should contain

In order to answer the first sub question, 'How can a text raise students' consciousness of the risks of plastic garbage in San Juan del Sur?' the findings have to be embed into the text that should raise students' consciousness.

As the 'Model of pro-environmental behaviour' showed that knowledge, values and attitutes and emotional involvement are factors, which influence people's environmental consciousness. For this reason the text should address these factors. It should include information of the risks of plastic garbage and arguments about why people should behave more environmentally friendly. Furthermore pictures, like pictures of animals which became victims of environmental degradation, should be attached, in order to evoke an emotional reaction of the reader. As found before, it is possible that people act pro-environmentally on grounds of their own well-being or of the well-being of their family. For this reason, the text should mention that the consequences of plastic garbage are problems in San Juan del Sur. This makes the reader feel that the problem is very close and not far away in any place of the world. Furthermore it should especially be focused on the health of the people in San Juan del Sur that is threatened by plastic garbage, so that the reader is aware about the threat for himself and his family. Thereby it is important that the reader understands the influence of his or her own behavior on people's health. In addition, the text should strengthen the internal locus of the reader. Also the eudaimonic well-being of the reader should be ensured. In other words, the reader should feel that he or she is able to behave in a certain way and that his or her behavior is meaningful and influential. This could be reached by giving some solutions for the problem, which are easy to perform. The reader can realize that there are possibilities to contribute to a cleaner environment and he or she can use these possibilities.

Not only the content of the text is important, but also the design of the text. One important point is that pictures are included in the text. A picture can be a suitable medium to

grab students' attention and remember the information. Houts et al. (2006) did research on the role of pictures in improving health communication. Thereby it was shown that pictures that are linked to text can increase attention of people and increase their recall of information regarding health education. Additionally, the text should be written in a big font size. Especially for young students texts with big font size are more attractive to read (Bernard et al., 2001).

3. Methods

This chapter familiarizes with the data collection of the field study. The study location and dates, the sample and the design are particularized. Furthermore the procedure, the measures and the data analysis are described.

3.1 Field study location and dates

The field study took place in San Juan del Sur, a coastal town on the Pacific Ocean, located in the Rivas department in southwest Nicaragua. The municipality is popular among surfers and is a vacation spot for many Nicaraguans and foreign tourists. Furthermore it is popular among expats, which left their home countries in order to build a new life in San Juan del Sur. The town is surrounded by many beaches and forests. Wild animals, such as turtles and monkeys, are not only popular tourist attractions, but are also protected and supported by many inhabitants.

For the field study students from two different schools were involved. School A is a non-profit organization that provides high quality English and international education to both, expat and local students, in San Juan del Sur and Rivas. The school is located in town. The building consists of some small classrooms and a little garden. The students of School A are predominantly locals, whose native language is Spanish. School B is a high quality, international English preschool that is educating expat and local students in San Juan del Sur bilingually. It is located in a sustainable farm in the mountains about 3 miles northeast of San Juan del Sur. The building consists of some small classrooms and a big playground, surrounded by forests and fields. The students of School B are predominantly expats and speak English. The data collection for the field study took about four weeks. It started on 16th March and ended on 11th April, 2016.

3.2 Participants

For the field study 30 students from School A and School B were recruited. The two schools were chosen, because of their differences. School A is more focusing on teaching English to particularly local students and School B is teaching different subjects (also science and environmental issues) to particularly expat students. The students needed a particular level of reading skills in order to read the text and the questionnaires. The levels of these skills varied between the students. Therefore, the researchers and teachers selected students with sufficient reading skills for the study.

Six students were eliminated from analysis, because they obviously did not understand or did not completely read the text. This was determined by three questions about the content of the text that the students had to answer. That means that the data of 24 students was processed for the study. Sixteen students of them went to School A. They went to local schools in the morning and visited School A for about four hours in the afternoons, in order to learn English. The other eight students went to School B. They visited the school for about eight hours a day and got educated in different subjects. Both genders were represented (11 male students, 13 female students). The students' age ranged from eight to fourteen years (Mean= 10.38, Standard Deviation= 1.64). As mentioned before, the students have different reading skills, irrespective of their age. Sometimes older students are taught in reading together with younger students. For this reason the age range is quite big. Due to the fact that School B is particularly teaching expat students, some of the participants were born in Nicaragua and some of them were born in other countries, such as the United States and Costa Rica (20 Nicaraguans, 4 expats).

In San Juan del Sur, there are other private, but also public schools. Often these schools do not have the possibilities to do environmental projects. Local schools sometimes follow totally different educational programs. Therefore, it is possible that the level of consciousness regarding plastic garbage of the participants in the field study differ from the consciousness of students from other schools in San Juan del Sur. For this reason, findings are not generalizable. Due to the fact that the field study was elaborated in a developing country, organizational problems and other circumstances compromised the search of further participants for the field study.

3.3 Design

In order to answer the research question “Can the consciousness of students with a low consciousness of the risks of plastic garbage in San Juan del Sur be raised by a special featured text?”, a suited research design was developed. The study took place in students’ natural school environment as part of their everyday lessons.

Based on the results of the literature study (see also the theoretical framework), a special featured text was developed to influence the students’ consciousness. Consciousness was assessed with a questionnaire. The scores of the students’ consciousness represent the dependent variable. The consciousness was measured three times (repeated measures), namely before (pretest), immediately after (post-test) and four weeks after (follow-up test) reading the special featured text. The students were divided randomly into two groups, 16 students were in the experimental group and 14 students in the control group. Thereby the treatment of the experimental group is the special featured text and the treatment of the control group is a short story (‘Goldilocks and the three bears’) that shouldn’t have influence on the consciousness of the students. The control group was necessary for proving, if the independent variable (the text) had influence on the dependent variable (the scores) or if the dependent variable was influenced by other factors, like the pretest (the first questionnaire).

3.4 Instruments

For the field study two instruments, a text about risks of plastic garbage in San Juan del Sur that should influence students’ consciousness of risks of plastic garbage, and a questionnaire that should measure students’ consciousness of the risks of plastic garbage. Both, the text and the questionnaire, were written in English and Spanish, in order to consider the language skills of the students. The Spanish version was given to the students at School A, because the students’ native language is Spanish. The English version was given to the students of School B, because the students’ native language is predominantly English and all students are taught in English. The two instruments are described as follows.

3.4.1 Text 'Where does all the plastic go in San Juan del Sur?'

The text is especially constructed for our target group is based on the findings in the theoretical framework. The text includes special features that should raise students' consciousness of the consequences of plastic garbage and additionally should catch the reader's attention. The text can roughly be divided into four sections.

The first section consists of a short story about a boy, living in San Juan del Sur, who is tired of carrying an empty plastic bottle inside of a plastic bag all the way home. In the end he left the garbage at the roadside and the wind blows it down into the sea. Some key words are included, such as 'Fresca[9]' and 'Iguana Bar[10]'. The story and the key words at the beginning of the text should increase the interest of the reader. The reader knows the environment of the protagonist, so that he or she can easily put his- or herself into the protagonist's position.

In the second section two questions are answered: "What do you think will happen to the plastic bag and the plastic bottle after one year?" and "What do you think will happen to the plastic bag after one hundred years?" The reader gets informed about the fact that even after one hundred years plastic won't be degenerated. The questions work interactive. It animates the reader to think about the life span of plastic garbage. If the reader does not have a clue about the answer, the answer can work surprisingly.

The third section includes information about risks of plastic garbage. The section describes the effects of plastic garbage on people's and animals' health, if landed in soil or water, e.g. the sea. Also the effects of burning plastic garbage on people's and animals' health are described. In this section the reader get informed about the consequences of throwing plastic garbage away and burning plastic garbage, which contribute to the reader's knowledge and values. The consequences are explicit described as problems in San Juan del Sur. It is especially focused on the health of people and animals in San Juan del Sur that is threatened by plastic garbage, so that the reader feels more responsible for the problem. As mentioned before in the theoretical framework, people especially feel responsible for their own well-being and their family's well-being. The information that animals can mistake plastic garbage for food, is supported by two pictures, which show the problem that occur when turtles encounter plastic garbage. For example, one picture shows a turtle that is caught up in a plastic holder for drinks.

[9] A popular soft drink in Nicaragua, compareabel with Fanta
[10] A popular bar close to the beach in San Juan del Sur that almost everybody knows

This picture in combination with the information of cause and effect of this situation evokes an emotional reaction of the reader. As mentioned before, emotional involvement is part of environmental consciousness, which contribute to pro-environmental behavior.

The forth section includes information about how a single person can contribute to a lower plastic garbage consumption. Easy examples about reducing, reusing and recycling are mentioned, e.g. the idea of using a shopping bag out of cloths or making a flower pot out of plastic bottles. Often people understand the problem and want to change their behavior, but do not know how to do it. This can work demotivating, so that people change their attitude after a while and get back to their old habits. In this section the reader get informed about possible solutions for the plastic garbage problem. This is important, because it supports the internal locus of control. The reader gets the impression that it is not difficult to act more environmental friendly. Additionally, these solutions show the reader a possible way out of the cognitive discrepancy that may arise while reading the sections before. The reader is now aware about the fact that plastic garbage is bad. In order to restore a cognitive consistency, the reader could easily follow the suggestions of reducing, reusing and recycling for his or her prospective behavior.

Especially the last two sections are important, because the reader gets the impression that he or she can make a change as a single person and that his or her behavior is meaningful for the people and animals living in San Juan del Sur. Thereby the eudaimonic well-being is ensured, which can contribute to a sustainable pro-environmental behavior regarding plastic garbage, as mentioned in the theoretical framework. Furthermore pictures and tables make the whole text more concrete. The font size is relatively big. As mentioned before, this makes the text more attractive for the respondent. In order to consider the reading skills of the students, the text is written in a language, that is easy understandable for the students. This was estimated by teachers of both schools.

3.4.2 Questionnaire

In order to measure the students' consciousness of the risks of plastic garbage a paper-based questionnaire was generated. This variable is ordinal. The questionnaire can be divided into two sections. The first section is 'About you'. It includes the demographic data of the respondents. Thereby the respondent's gender, name and age, the name of the school, which the respondent visits and the respondent's country of birth is presented.

The second section ‘What do you think? Give your opinion!’ consists of eight closed-ended questions about the consciousness of the risks of plastic garbage. In this section the respondent is presented with a 9-point Likert-type scale, a continuous scale with a set of nine items. For example, there are nine response options for question 1 in the second section. To measure the consciousness of the risks of plastic the respondents are asked: “How healthy is plastic for humans?”. Respondents can give an answer on a 9-point Likert-type scale ranging from 1= ‘very unhealthy’, 5= ‘no influence’ to 9= ‘very healthy’.

In order to measure the understanding of the text, three extra questions (two closed-ended, multiple choice questions and one open-ended question) about the text were compiled. The questionnaire considers the age and the reading skills of the target group. The questions are short and easy understandable. Some questions are similar and differ from some words. These words are underlined, in order to avoid misunderstandings. In order to improve the orientation, emotions are attached to the 9-point Likert-type scale. For example, to the item ‘very unhealthy’ a smiley in a bad mood and to the item ‘very healthy’ a smiley in a good mood is attached. This technique is also called ‘Smileyometer’ and increases the reliability of the questionnaire (Van der Sluis, Van Dijk, & Perloy, 2012). Furthermore smileys and a relatively big font size makes the questionnaire more attractive for the respondent, so that the respondent is more motivated to fill it in.

3.6.4 Reliability

The questionnaire, as an instrument to measure consciousness of the consequences of plastic garbage, was self-developed. For this reason a factor analysis was conducted and the reliability of the questionnaire was measured. First the negative scaled questions were rescaled. The questionnaire includes five negative and three positive scaled questions. For example, question one “How healthy is plastic for humans?” has a Likert-scale ranging from 1= “very unhealthy” to 9= “very healthy” which means that a student that checked 1= “very unhealthy” would score very high on consciousness and a student that checked 9= “very healthy” would score low on consciousness. In order to determine the average score of the student on all questions, the negative scaled questions (question 1, 2, 3, 4 and 8) were rescaled.

The questions of the questionnaire were chosen to measure the factor ‘consciousness of the consequences of plastic garbage’. In order to evaluate if all questions measure the same

factor, a factor analysis was executed. Thereby it was found that there are three subscales in the first measurement, three in the second and three in the third measurement. In the first measurement question 1, 2 and 3 of the questionnaire, question 4 and 5, and question 6, 7 and 8 respectively built one subscale. One reason could be that the students thought that the first three questions refer to the primary environment. For example, the second question "How healthy is plastic for animals?" could lead to misunderstandings. Students may think that this question refers to animals in their primary environment, such as pets. After the first three questions, they answered question 4 and 5, which showed that the questions also could refer to the farther environment, such as wild animals (cp. question 4 "How does burning plastic garbage influence animal's health?"). The last three questions (question 6, 7 and 8) were more interpreted as questions of the own behavior and its impact on the environment (cp. question 7 "How would it influence the environment, when you bring your own bag to the supermarket in order to carry your shoppings home?").

In the second measurement question 1 – 4, question 5 and 6, and question 7 and 8 respectively built one subscale. This change may occurred, because of the fact that the students have read the text before and therefore are primed. The text describes, for example, turtles (described as wild animals in the sea) that suffer from plastic garbage. Therefore the situation got clear about what kind of animals were described in the second measurement. The first subscale (question 1 – 4) can be interpreted as a measurement for the consciousness of the influence of plastic garbage in general and burning plastic garbage on the health of people and animals. The second subscale (question 5 and 6) can be interpreted as a measurement of someone's own behavior and its influence on the sea and therefore on people's and animals' health. And the third subscale (question 7 and 8) can be interpreted as a subscale about someone's future behavior regarding plastic production.

In the third measurement question 1 – 4 and 8, question 5 and 6, and question 7 respectively built one subscale. This showed that question 8 was kind of problematic in some tests. The Likert-scale of question 8 ("How much plastic garbage are you planning to produce in the next week?") was supported by an arrow down for "Less than before" and an arrow up for "More than before", which can influence the respondent's answer. After reading the text the respondent may be willing to contribute to the environment in a positive way and may link the arrow up to something positive, like his or her intention was. Some respondents could have

roughly read the question and therefore checked something they did not actually intended. All in all, the factor analysis showed that the questionnaire is very sensible for the respondents' pre-knowledge.

All in all, three subscales can be distinguished. Subscale 1 (question 1 to 4) measures the consciousness of the influence of plastic garbage in general and burning plastic garbage on the health of people and animals, whereas subscale2 (question 5 an 6) measures the consciousness of someone's own behavior and its influence on the sea and therefore on people's and animals' health. Subscale3 (question 7 and 8) measures the future behavior regarding plastic garbage and the willingness to contribute to a cleaner environment.

In order to measure the reliability of the questionnaire, a reliability analysis was conducted for all three subscales and all three measurements. The first subscale consists of four items. Therefore Cronbach's alpha was measured. The second and the third consist of two items. Therefore correlations were measured (Pearson's r). The results showed that the items of the first and second subscales were mainly statistically significant reliable during the measurements, but the items of the third subscale were statistically not significant reliable during all three measurements (see Table 1). That means that there was no correlation between item 7 and item 8. Consequently the third subscale was deleted.

Table 1. *Reliability analysis*

	Pretest	*Post-test*	*Follow-up test*
Sub1^{+}	.60*	.60*	.73*
Sub2^{++}	.19	.58*	.64*
Sub3^{++}	.22	-.08	.10

***** significant at .05 or acceptable at .60
\+ Cronbach's alpha
++ Pearson's r

3.5 Procedure

The students in the experimental group first filled in the questionnaire, then read the text ‘Where does all the plastic go in San Juan del Sur?’ and immediately filled in the questionnaire again, plus the three extra questions that prove the understanding of the text. The students in the control group first filled in the questionnaire, then read a short story, (‘Goldilocks and the three bears’) and immediately filled in the questionnaire again. After four weeks all students from both groups filled in the questionnaire again. All students had sufficient time to read the texts and the questionnaire. The average time the students needed to read the questionnaire was about five minutes. For the text ‘Where does all the plastic go in San Juan del Sur?’ they needed about ten minutes on average and for the short story ‘Goldilocks and the three bears’ they needed about eight minutes on average.

3.7 Data analysis

In order to answer the first sub-question the students’ average scores of all three measurements for both subscales were determined. After that the distributions of the scores of all measurements for both subscales were measured. Thereby it was shown that the scores of the first and third measurements of both subscales are normally distributed, but that the scores of the second measurements of both subscales are not normally distributed. For this reason the Mann-Whitney U test was used to measure the difference between the experimental and the control group for both subscales. In order to answer the third sub-question, the students with a low consciousness were determined. This was determined by eliminating all students from the analysis that did not answered correctly on all three extra questions about the text. The Mann-Whitney U test was used again, in order to measure the difference between the experimental and the control group for both subscales.

1. Results

This chapter presents the results of the field study of the influence of a special featured text on students’ consciousness regarding the risks of plastic garbage. The quantitative data that is collected by the questionnaire, was statistically analyzed. The first section of this chapter answers the second sub-question: ‘Does reading a special featured text increase students’

consciousness of the risks of plastic garbage?' The second section of this chapter answers the third sub-question: 'Does reading a special featured text increase students' consciousness of the risks of plastic garbage, when their consciousness was low before?'.

For the first sub-question the Mann-Whitney U test was conducted to measure the difference between the experimental and the control group. Thereby the average scores of the experimental and the control group of the pretest, post-test and follow-up test for subscale1 and subscale2 were included. It was shown that the differences between the experimental and the control group, regarding the scores of the pretest for subscale1 (MWu= 48.0; p>.05) and the scores of the pretest for subscale2 (MWu= 49.5; p>.05), are statistically not significant (Table 2). The difference between the experimental and the control group, regarding the scores of the post-test for subscale1, is statistically significant (MWu= 40.0; p<.05) (Table 2). Thereby the average score of the experimental group (MEAN= 15.5) is higher than the score of the control group (MEAN= 10.36) and the students in the experimental group scored higher in the post-test higher on subscale1 than on the pre-test (MEAN= 14.7) (Table 3). The difference between the experimental and the control group, regarding the scores of the post-test for subscale2, is statistically not significant (MWu= 50.5; p>.05) (Table 3). Furthermore, it was shown that the differences between the experimental and the control group, regarding the scores of the follow-up test for subscale1 (MWu= 44.5; p>.05) and the scores of the follow-up test for subscale2 (MWu= 51.0; p>.05), are statistically not significant (Table 3).

Table 2. *Results of the Mann-Whitney U test for subscale1 and subscale2 of all three measurements*

Test Statistics[a]

	EnvConsMeanC1sub1	EnvConsMeanC2sub1	EnvConsMeanC3sub1	EnvConsMeanC1sub2	EnvConsMeanC2sub2	EnvConsMeanC3sub2
Mann-Whitney U	48,000	40,000	44,500	49,500	50,500	51,000
Wilcoxon W	153,000	145,000	122,500	104,500	155,500	129,000
Z	-1,406	-2,094	-1,236	-1,238	-1,246	-,667
Asymp. Sig. (2-tailed)	,160	,036	,216	,216	,213	,505

Exact Sig. [2*(1-tailed Sig.)]	,212[b]	,084[b]	,314[b]	,235[b]	,259[b]	,582[b]

a. Grouping Variable: Group

b. Not corrected for ties.

Table 3. *Ranks of the average consciousness scores for subscale1 and subscale2 of both groups for all three measurements*

Ranks

	Group	N	Mean Rank	Sum of Ranks
EnvConsMeanC1sub1	experimental	10	14,70	147,00
	control	14	10,93	153,00
	Total	24		
EnvConsMeanC2sub1	experimental	10	15,50	155,00
	control	14	10,36	145,00
	Total	24		
EnvConsMeanC3sub1	experimental	10	13,05	130,50
	control	12	10,21	122,50
	Total	22		
EnvConsMeanC1sub2	experimental	10	10,45	104,50
	control	14	13,96	195,50
	Total	24		
EnvConsMeanC2sub2	experimental	10	14,45	144,50
	control	14	11,11	155,50
	Total	24		
EnvConsMeanC3sub2	experimental	10	12,40	124,00
	control	12	10,75	129,00
	Total	22		

For the second sub-question, ‘Does reading a special featured text increase students’ consciousness of the risks of plastic garbage, when their consciousness was low before?’, the

differentials of the average scores of the pretest and post-test of both groups were determined for subscale1 and subscale2. For the first subscale all students that scored under 7.75 on average were determined as students with a low consciousness (Table 4), and for the second subscale all students that scored under 7.0 on average were determined as students with a low consciousness (Table 5). In total 33.33 % of all students were determined as students with a low consciousness.

Table 4. *Differentials of the average scores of the pretest and post-test for subscale1*

EnvConsMeanC1sub1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4,00	1	4,2	4,2	4,2
	6,25	1	4,2	4,2	8,3
	6,75	1	4,2	4,2	12,5
	7,00	3	12,5	12,5	25,0
	7,50	1	4,2	4,2	29,2
	7,75	1	4,2	4,2	33,3
	8,25	1	4,2	4,2	37,5
	8,50	1	4,2	4,2	41,7
	8,75	1	4,2	4,2	45,8
	9,00	13	54,2	54,2	100,0
	Total	24	100,0	100,0	

Table 5. *Differentials of the average scores of the pretest and post-test for subscale2*

EnvConsMeanC1sub2

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	4,50	1	4,2	4,2	4,2
	5,00	1	4,2	4,2	8,3
	5,50	2	8,3	8,3	16,7
	6,00	1	4,2	4,2	20,8
	7,00	3	12,5	12,5	33,3

8,00	3	12,5	12,5	45,8
8,50	4	16,7	16,7	62,5
9,00	9	37,5	37,5	100,0
Total	24	100,0	100,0	

The Mann-Whitney U test was conducted again to measure the difference between the experimental and the control group. Thereby the differentials of the students with low consciousness in the experimental and the control group for subscale1 and subscale2 were included. It was shown that the difference between the experimental and the control group, regarding the differentials for subscale1, is not statistically significant (MWu= 6.0; p>.05) (Table 6). Thereby the differentials of the experimental group (MEAN= 8.5) were higher than the differentials of the control group (MEAN= 4.5) (Table 6). The difference between the experimental and the control group, regarding the differentials for subscale2, is statistically not significant (MWu= 8.5; p>.05) (Table 7).

Table 6. *Results of the Mann-Whitney U test for differentials for subscale1*

Ranks

	Group	N	Mean Rank	Sum of Ranks
DIFFsub1	experimental	6	8,50	51,00
	control	6	4,50	27,00
	Total	12		

Test Statistics[a]

	DIFFsub1
Mann-Whitney U	6,000
Wilcoxon W	27,000
Z	-1,953
Asymp. Sig. (2-tailed)	,051
Exact Sig. [2*(1-tailed Sig.)]	,065[b]

a. Grouping Variable: Group

b. Not corrected for ties.

Table 7. *Results of the Mann-Whitney U test for differentials for subscale2*

Ranks

	Group	N	Mean Rank	Sum of Ranks
DIFFsub2	experimental	6	6,08	36,50
	control	4	4,63	18,50
	Total	10		

Test Statistics[a]

	DIFFsub2
Mann-Whitney U	8,500
Wilcoxon W	18,500
Z	-,751
Asymp. Sig. (2-tailed)	,453
Exact Sig. [2*(1-tailed Sig.)]	,476[b]

a. Grouping Variable: Group

b. Not corrected for ties.

2. Discussion

The results for the first sub-question, 'Does reading a special featured text increase students' consciousness of the risks of plastic garbage?' are discussed as follows. First, the results have shown that there is no statistically significant difference of the scores of the pretest between both groups, regardless of the subscale. That means that the students had fairly equal levels of consciousness of plastic garbage before they got the treatment (the special featured text, respectively the short story). The equality may depend on the fact that the students were divided randomly into two groups.

Second, there is a statistically significant difference between the scores of the post-test between both groups, regarding subscale1 (questions 1 – 4), but not regarding subscale2 (questions 5 and 6). Different reasons for these findings are thinkable. As mentioned in chapter 3.6.4, question 1 to 4 measure the consciousness of the influence of plastic garbage in general and burning plastic garbage on the health of people and animals, whereas question 5 an 6 measure the consciousness of someone's own behavior and its influence on the sea and therefore on people's and animals' health. In the special featured text, there is mentioned that people and animals can get ill or die as a consequence of plastic garbage, a couple of times (e.g. "When

people or animals around breathe in the toxic smoke, they can get illnesses of breathing"). Also the fact that animals in the sea can suffer from plastic garbage, is discussed in detail and presented by pictures, so that some students scored high on question 5 (Imagine you lose one plastic bag and it lands in the sea. How dangerous is the plastic bag for the animals in the sea?). But question 6 ("Imagine you lose one plastic bag and it lands in the sea. How dangerous is the plastic bag for the people living around the sea?") refers to the fact that peoples' health can suffer from plastic garbage in the sea, because they might eat fish, which has eaten plastic garbage before. This fact is mentioned in the text only one time ("Animals, which have eaten plastic, can also have an effect on our health. For example, when we eat fish that has eaten plastic before, we consequently eat plastic that is toxic for us, as well."). This sentence can be missed by some students, especially when the students read the text very roughly. Both questions include words that are underlined, in order to distinguish the questions. The students could have read the questionnaires roughly, too. For example, they just recognized 'sea' and 'animals' and 'sea' and 'people' and thought that the consequences of plastic are higher for the animals than for the people, because animals mostly live closer to the sea or in the sea. In addition, question 5 and 6 are very long, in comparison to question 1 to 4. Some students do not like reading long sentences or are not able to understand long sentences, because of low power of concentration. Furthermore students could have troubles to understand this consequence of plastic garbage. Namely, in this case people's behavior regarding plastic garbage influences people's health indirectly. The chain of thought (from the person that throws the plastic garbage in the sea to the fish that eats the garbage and back to the person that eats the fish) is very long and might be difficult to understand for some students. These reasons could explain the low scores on question 6, even if the student have read the text thoroughly.

Third, the results have shown that there is no statistically significant difference of the scores of the follow-up test after four weeks between both groups, regardless of the subscale. In other words, the special featured text had no influence on the students' consciousness of the consequences of plastic garbage in long-term. As mentioned before, some students do not like reading texts. In reality, students at the age of 8 – 14 years have to deal with texts all day in school. They are probably bored of this. Therefore a text appears less unattractive to them and it won't leave a formative influence behind, in comparison to, e.g. a film.

The results for the second sub-question, ‘Does reading a special featured text increase students’ consciousness of the risks of plastic garbage, when their consciousness was low before?’, are discussed as follows. There is no statistically significant difference between both groups, regarding the difference of the scores of the pretest and the post-test for subscale1 (questions 1 – 4). This finding points out slightly that the special featured text can raise students’ consciousness of the consequences of plastic garbage in short-term, when their consciousness was low before. One reason for this not definitely result could be the little amount of respondents, which led to a little amount of data. Also some students scored the maximal possible scores on some questions of the pretest and could not score higher on the post-test (ceiling effect). Therefore the distinction between students with a high consciousness and a low consciousness was difficult.

All in all, it can be said that the special featured text raised the students’ consciousness of the influences of plastic garbage in general and of burning plastic garbage on people’s and animals’ health, in short-term. But it is not clearly proved that the special featured text raised the students’ consciousness of the influences of plastic garbage in general and of burning plastic garbage on people’s and animals’ health, in short-term, when the students’ consciousness was low before. Furthermore, it has to be mentioned that the findings are not representative for all students in San Juan del Sur. More respondents are needed to receive stable and significant data, which can be generalized. Also other private schools and especially public schools, which often have less possibilities to raise students’ environmental awareness, have to be addressed. In addition, more research on a suited teaching strategy has to be done. Even the text included both, special features to raise students’ consciousness of the consequences of plastic garbage and special features to grab students’ attention, the text had no long-term effect on the students’ consciousness. As mentioned before, the text were chosen, due to lack of technical resources in San Juan del Sur. The text was given to the students only one time. Maybe the students need to receive more education about this issue, than one text can deliver. For example, the text can be combined with a video over plastic garbage. Combining the treatment with another medium could help to achieve a higher effect, and maybe an effect in long-term. For example, students could get involved in an environmental project, where they can learn something about plastic garbage effects and are involved in activities to improve the situation, at the same time, so that they feel meaningful (increasing eudaimonic well-being). This could have the effect that the

students' consciousness increases for a long time, maybe for their entire lifetime, so that the influence on their environmental behavior is more sustainable.

During the execution of the study many practical difficulties occurred. Most of these difficulties were related to the fact that the field study took place in a developing country. Time and technical limitations restricted the extent of the study. For example, often the internet was slow and sometimes the electricity broke down for a while. Therefore more sophisticated interventions as videos or games were difficult to implement in the schools. Creating a text seemed to be easier than creating a video, and also fitted everyday practices in schools. Furthermore, there were financial limitations. Copies, in general, are quite expensive in San Juan del Sur, especially colored copies. Therefore the text and questionnaires were black-white copies, which possibly made them appear less attractive to the students. For future research it is important to be flexible, while executing a field study, especially in developing countries. Often things cannot be prepared in advance or the situation is different as expected before.

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4. Appendix

4.1 Text 'Where does all the plastic go in San Juan del Sur?'

Where does all the plastic go in San Juan del Sur?

Imagine there was a 15-year-old boy, called Brian, living in San Juan del Sur in Nicaragua. One day Brian went to the *Palí* and bought a bottle of *Fresca*. At the check-out, of course, he got one of the grey plastic bags for his shopping. He left the supermarket carrying the *Fresca* in the plastic bag. On the way home he got thirsty and decided to drink the *Fresca*. After a while Brian got tired of carrying the plastic bag and the empty bottle. But he couldn't find a trash can on his way home, so he left the garbage at the road side, thinking that the pick-up service will pick it up tomorrow morning. Brian went home, the plastic bag and the empty bottle inside were still at the road side. After a while the wind blew through the streets and made the garbage moving. First it moved for just a couple of meters, but then the wind got stronger and the garbage flew over the houses straight between *El Timon* and *Iguana Bar*, where it came down and finally ended in the sea, where it will stay for the rest of its life.

What do you think will happen to the plastic bag and the plastic bottle after one year?

They will still be there.

What do you think will happen to them after one hundred years?

They will still be there. Plastic breaks down into smaller and smaller toxic pieces after a while. The plastic bag and the plastic bottle will take 400 – 1,000 years until they fully degrade (disappear)[11].

This table shows how much time different kinds of garbage will take to degrate if left in the environment[12]:

Vegetables	5 days – 1 month
Paper	2 – 5 months
Milk carton	5 years
Aluminium can for drinks	80 – 100 years
Styrofoam cup	400 – 1,000 years
Plastic bottle or bag	400 – 1,000 years

Many plastics include chemicals, like BPA and Phthalates, which are toxic for humans, animals and the planet!

The effects of plastic

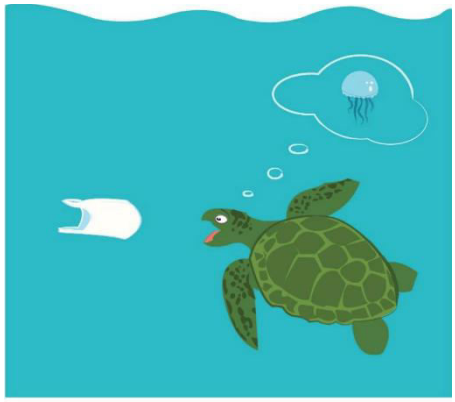
Plastic, if ended in the water (like in the sea) or in the soil, can have bad effects on the environment that can affect human's and animal's health in San Juan del Sur. For example:

[11] https://conservingnow.com/plastic-bag-environmental-impact/

[12] http://sciencelearn.org.nz/Contexts/Enviro-imprints/Looking-Closer/Measuring-biodegradability

Plastic in the soil can break down into tiny pieces, which can get into the groundwater and consequently pollute the water that we are drinking. This can cause illnesses, like cancer[13].

Animals, like sea turtles or albatross, around San Juan del Sur could mistake plastic for their food and consequently get ill or die. Researchers say that more than half of sea turtles have eaten plastic[14]. Animals, which have eaten plastic, can also have an effect on our health. For example, when we eat fish that has eaten plastic before, we consequently eat plastic that is toxic for us, as well.[15]



Turtles often mistake ¡Sometimes turtles are caught up in plastic garbage, like this fishes and consequentplastic holder for drinks.

When I throw plastic in the trash…

In San Juan del Sur the garbage from the trashes, including plastic garbage, in town is picked up every day and is brought to a big garbage dump, where the garbage gets burned. Some families on the countryside burn their garbage behind or inside their houses.

[13] http://www.conserve-energy-future.com/causes-effects-solutions-of-plastic-pollution.php
[14] http://www.iflscience.com/plants-and-animals/52-world-s-sea-turtles-have-eaten-plastic
[15] http://plastic-pollution.org/

Especially burning plastic can cause heavy air pollution. When people or animals around breathe in the toxic smoke, they can get illnesses of breathing[16].

What can I do?

You can contribute to a cleaner environment and ensure the health of humans and animals in San Juan del Sur. There are 3 different things you can do:

Reduce the use of plastic products. For example, bring your own shopping bag (e.g. out of chloth) and use ceramic plates at home instead of plastic plates.

Reuse plastic products before you throw them away. For example, you can use plastic bags more often or reuse them as garbage bags. Wash plastic bottles out and refill them with water. Also old playing toys could be useful for someone. Ask, for example, other families before you put them in the trash.

Recycle plastic products. That means, turn them into new. Get creative. For example, use old

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plastic bottles to store food or pencils in there. You can even create some flower pots.

4.2 Questionnaire

Questionaire

About you

Gender: **O** Male **O** Female

Name: _____

Age: _____ years

Name of your School: _____

Country of birth: _____

About the text

1. How long does a plastic bag need to degrade (disappear)?

   O 3 months

   O 2 - 5 years

   O 400 – 1,000 years

2. Write down 3 risks of plastic garbage.

   1. _____

   2. _____

   3. _____

3. How can you help to make the environment cleaner and ensure the health of people and animals in San Juan del Sur?

   o I can burn the plastic garbage

   o I can reduce, reuse and recycle plastic products

   o I can't do anything

What do you think? Give your opinion!

1. How healthy is plastic for <u>humans</u>?

o **o** **o** **o** **o** **o** **o** **o** **o**

Very unhealthy — No influence — Very healthy

2. How healthy is plastic for <u>animals</u>?

o **o** **o** **o** **o** **o** **o** **o** **o**

Very unhealthy — No influence — Very healthy

3. How does burning plastic garbage influence <u>humans' health</u>?

o **o** **o** **o** **o** **o** **o** **o** **o**

Very bad for humans' health — No influence — Very good for humans' health

4. How does burning plastic garbage influence <u>animals' health</u>?


o o o o o o o o o


Very bad for animals' health — No influence — Very good for animals' health

5. Imagine you lose one plastic bag and it lands in the sea. How dangerous is the plastic bag for <u>the animals</u> in the sea?


o o o o o o o o o


Not dangerous — Very dangerous

6. Imagine you lose one plastic bag and it lands in the sea. How dangerous is the plastic bag for <u>the people</u> living around the sea?


o o o o o o o o o

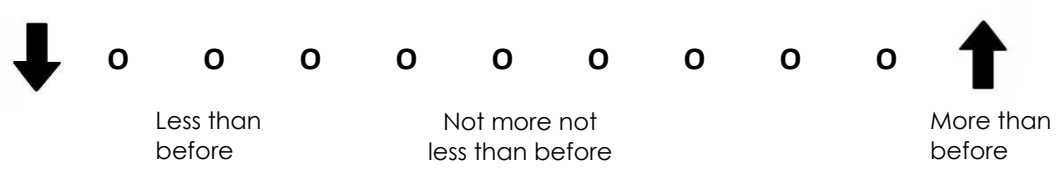

Not dangerous — Very dangerous

7. How would it influence the environment, when you bring your own bag to the supermarket in order to carry your shoppings home?


o o o o o o o o o


Very bad for environment — No influence — Very good for environment

8. How much plastic garbage are you planning to produce in the next week?



4.3 Text (Spanish version)

A donde va el plástico en San Juan del Sur?

Imagina que hay un chico que tiene 15 años y se llama Bryan. El vive en San Juan del Sur en Nicaragua. Un dia Bryan fue a *Palí* y compró una botella de *Fresca*. En caja, claro que sí, el recibió una de las bolsas plásticas gris para las compras. El salió del supermercado y puso las frescas en bolsas plasticas. En el camino a casa el estaba sediento y decidió tomar la *Fresca*. Después de algunos minutos Bryan estaba cansado de llevar la bolsa y la bottella vacia. Pero no pudo encontrar un bote de basura en el camino a casa, entonces el olvidó la basura al borde de la calle. El estaba pensando, que el recogedor de la basura va a recogerla el proximo día. Bryan fue a la casa y la bolsa plástica y la botella vacia estaban aun al borde de la calle todavía. Después de algunos minutos el viento sopló en la calle y la basura se movió. Primero se movió solo para algunos metros, pero después el viento fue mas fuerte y la basura voló arriba de las casas en dirección de *El Timon* y *Iguana Bar*, donde la basura arribó. Al final se acabó en el mar, donde se quedó durante el resto de la vida.

¿Que piensas, que va a pasar con la bolsa plástica y la botella plástica después de un año?

Estan allí todavía.

¿Que piensas, que va a pasar con la bolsa plástica y la botella plástica después de cien años?

Estan allí todavía. Plástico se disgrega en mas y mas pequeñas porciónes tóxicas después de un rato. La bolsa plástica y la botella plástica van a degradarse (desaparecer) en 400 – 1,000 años[17].

Esta tabla indicia en cuanto tiempo diferente tipos de basura necesitan para degradarse en el medioambiente[18]:

Vegetales	5 días – 1 mes
Papel	2 – 5 meses
Cartón de leche	5 años
Bote de aluminio para bebidas	80 – 100 años
Vaso de corcho blanco	400 – 1,000 años
Botella o bolsa plástica	400 – 1,000 años

Los efectos del plástico

Plástico, si se acaba en el aqua (por ejemplo en el mar) o en la tierra, puede contaminar a el medioambiente, que puede afectar la salud de los humanos y los animales en San Juan del Sur. Por ejemplo:

Plástico disgrega en pequeñas porciones, que pueden ensuciar las agua subterráneas, que la gente toman. Eso puede causar enfermedades, como cáncer[19].

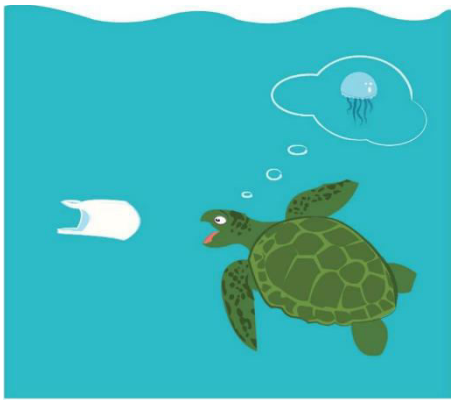
Los animales, como tortugas o pelicanos, en torno de San Juan del Sur pueden equivocar el plástico y pueden pensar que es comida. Ellos pueden contraer enfermedades o pueden morir.

[17] https://conservingnow.com/plastic-bag-environmental-impact/

[18] http://sciencelearn.org.nz/Contexts/Enviro-imprints/Looking-Closer/Measuring-biodegradability

[19] http://www.conserve-energy-future.com/causes-effects-solutions-of-plastic-pollution.php

Investigadores dicen, que mas de el 50 % de las tortugas comían plástico[20]. Los animales, que comían plástico, pueden malear la salud de nosotros también. Por ejemplo, sí nosotros comemos pescado, que antes comío plástico, por consiguiente comemos plástico también, que es tóxico para nosotros[21].



Las tortugas equivocan bolsas plásticas frecuentamente y piensan que son medusas. Por consiguiente ellas las comen.

A veces las tortugas quedan atrapadas en la basura plástica, como este envoltura de algunas bebidas.

Cuando yo boto plástico en un bote de basura…

En San Juan del Sur la basura en los botes, incluido la basura plástica, en el pueblo se recoge todos los días y se trae a un grande vertedero, donde la basura se quema. Algunas familias en el campo queman la basura después o dentro de las casas.

En especial, quemar plástico puede causar fuerte contaminación del aire. Cuando la gente o los animals alredador inhalan el humo tóxico, ellos pueden contraer enfermedades respiratorias[22].

¿Que puedo hacer?

[20] http://www.iflscience.com/plants-and-animals/52-world-s-sea-turtles-have
[21] http://plastic-pollution.org/
[22] http://www.conserve-energy-future.com/causes-effects-solutions-of-plasti

Tú puedes contribuir a un medioambiente mas limpio y aseguarar la salud de los humanos y los animales en San Juan del Sur. Hay 3 cosas diferentes, que puedes hacer:

Reduce el uso de los productos plásticos. Por ejemplo, trae una bolsa (por ejemplo de tejido) para hacer la compra y usa los platos cerámicos en la casa en lugar de platos plásticos.

Reutiliza los productos plásticos antes de que los botas. Por ejemplo, puedes usar las bolsas plásticas mas frecuentamente o reutilizarlas como las bolsas de basura. Limpia las botellas plásticas y puedes rellenarlas con agua para uso personal. También juguetes viejos pueden ser beneficioso para otros. Pregunta, por ejemplo, a otras familias antes de botarlos.

Recicla los productos plásticos. Eso significa que hacer cosas nuevas de las cosas viejas. Va a estar mas creativo. Por ejemplo, usa viejas botellas plásticas para depositar la comida o las chavetas

dentro. También puedes crear unos floreros.

4.4 Questionnaire (Spanish version)

Questionario

Acerca de ti:

Genero: **O** Hombre **O** Mujer

Nombre: _____

Edad: _____ años

Nombre del colegio: _____

Ciudad de Nacimiento: _____

Sobre el Texto:

4. ¿Cuanto tiempo necesita una botella plástica para degradarse?
   O 3 meses
   O 2 - 5 años
   O 400 – 1,000 años

5. Escribe 3 peligros del plástico.
   1. _____
   2. _____
   3. _____

6. ¿ Que puedes hacer para crear un medioambiente mas limpio y asegurar la salud de la gente y los animales en San Juan del Sur?

   O Puedo quemar la basura plástica

O Puedo reducir, reusar y reciclar los materiales plásticos

O No puedo hacer nada

Que piensas? Da tu opinion!

9. ¿ Que tan saludable es el plástico para <u>los humanos</u>?

O

O O O O O O O O

Muy saludable

No saludable

Sin consecuencias

10. ¿Que tan saludable es el plástico para <u>los animales</u>?

O

O O O O O O O O

Muy saludable

No saludable

Sin consecuencias

11. ¿Como influencia el quemar plástico en <u>la salud humana</u>?

O O O O O O O O O

Muy bueno para la salud humana

Muy malo para la salud humana

Sin influencias

12. ¿Como influencia la quema de plástico en <u>la salud animal</u>?

o o Muy malo para la salud animal

o o o o o

Muy bueno para la salud animal

o o

No influencias

13. Imagina que sueltas una bolsa plástica y termina en el oceano. ¿Que tan peligroso resulta eso para <u>los animales</u> del oceano?

o o o o o o o o o

Muy peligroso

No peligroso

Sin consecuencias

14. Imagina que sueltas una bolsa plástica y termina en el oceano. ¿Que tan peligroso puede ser para <u>las personas</u> que viven cerca del oceano?

o o o o o o o o o

Muy peligroso

No peligroso

Sin consecuencias

15. ¿Como imfluenciaria al medioambiente, si trajeras tu propia bolsa al supermercado para cargar tus compras?

o o o o o o o o o

Muy malo para el medioambiente

No influencias

Muy bueno para el medioambiente

16. ¿Cuanta basura plástica planeas producir en la proxima semana?

o o o o o o o o o

Menos que antes

Ni mas, ni menos que antes

Mas que antes