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# **Effects of Environmental Educations for Organisations**

An evaluation of the factors for changes after an Basic  
Environmental Education at Ekocentrum

Master's thesis of Learning and Leadership

Lisa Strand  
Rickey Mleczkovicz Katz



MASTER'S THESIS 2017:139

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Department of Applied Information Technology  
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Department of Applied Information Technology  
Chalmers University of Technology  
SE-412 96 Gothenburg  
Telephone +46 31 772 1000

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Lisa Strand & Rickey Mleczkovicz Katz  
Department of Applied Information Technology  
Chalmers University of Technology

## Abstract

This study investigate what influence an basic environmental education has on an organisation as well as what conditions promotes change. The evaluation focuses on the basic environmental education by Ekocentrum. The main collection of data was done with a survey that was sent to previous participants of Ekocentrum's education. The survey was completed with seven interviews. The analysis was performed in SPSS and the method which gave best result was comparing mean values.

The most important effect of the education found was the change of mindset and the awareness of the environment at the work places. Furthermore, built-on approach of changes were common, instead of more profound changes. Of the different causes investigated, none correlate substantial with the effects of the environmental education. The biggest influence comes from the participants position in the organisation and their level of anticipation towards the education. Besides the investigated factors the setup of the education and the environmental awareness of the management was mentioned in the survey as big influences on the changes made. As this is to be considered as a pilot study there are many possible ways to go through with future studies.

Keywords: environmental education, sustainable development, environmental certificate, SMEs, environmental awareness, environmental practices, educations for sustainability



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# 1

## Introduction

It is hard to say what external factors that makes the effects of an education greater. The same applies on fully understanding sustainable development, which parts it contains and the possible measures. This chapter will introduce the challenges to understand educational effects and introduce sustainable development. Finally, the aim, research questions and delimitations will be presented.

### 1.1 Background

Sustainable development is a widespread concept nowadays. The most common definition of sustainable development originates from the World Commission on Environment and Development (1987):

”Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.”

- World Commission on Environment and Development (1987)

Sustainable development can be divided into three pillars: the environment, the economy and the society (National Research Council, 1999). As important as all of them may be, the focus is often not equally distributed between them. For real sustainable development, everyone must strive to fulfil all three parts. The problem is that it is very easy to only notice and focus on the part closest to one’s heart or one’s work and forget the other two (Sterling, 2004).

There has been an increased environmental awareness during the last decades (Gadenne, Kennedy, and McKeiver, 2009). In Sweden, an indication of how important a sustainable society is for some of the Swedish citizens is the waste management of Swedish households (Avfall Sverige, 2016). This in turn affects organisations in Sweden. For the last 50 years, there have been more requirements for Swedish organisations; not only in the form of laws and regulations, but also from customers on their shops and retailers on their suppliers. In public procurements, there is a frequent demand of suppliers to work with an environmental management system (Upphandlingsmyndigheten, n.d.).

Environmental management systems (EMS) are packages with clear procedures to help organisations with their environmental work. EMS gives structure in the environmental work with different fragments, such as formulate environmental goals, determine the environmental impact of the organisation and working to minimize its

impacts. The most common EMS are *International Organization for Standardization 14001* (ISO 14001) and EU: s *Eco Management and Audit Scheme* (EMAS). But for small and medium-sized enterprises (SMEs) both ISO 14001 and EMAS could be too comprehensive and therefore they can choose the Swedish environmental certification <sup>1</sup>. (Naturvårdsverket, 2000)

One of the criteria to attain, or retain, the environmental certification is that all employees must participate in a basic environmental educational event. There are several operators on the market that provides these educations, among others RMS&CO, Miljögiraffen and IRC (RSM&CO, n.d. Miljögiraffen, n.d. & Idé & ResursCentrum, n.d.). Another provider is the foundation Ekocentrum. Ekocentrum is a non-profit organisation that works to encourage environment issues and sustainable development. They are the caretakers of Sweden's largest permanent exhibition about sustainable development and they provide educations for organisation and the public (Ekocentrum, n.d.-a, n.d.-b). Their basic education has a duration of half a day and can be practiced at Ekocentrum's or the customers' own offices. Ekocentrum are continuously working to improve their education and exhibition due to changes in the world and the environmental movement. They also have interest in the effects of the education to adjust it for optimal effects.

Further education of staff is an important part of many organisations' developing work. If there is a change in behaviour of the participants or organisation depends largely, but not solely, on the education. Therefore, it is crucial that the educator has competence within the subject for the education to have the desired effect; for example, giving the staff greater insight or increase knowledge of the subject. Other than the educators' educational quality there may be a lot of factors which can affect what changes are made. Richardson & Denton (1996) states that one of the most important factor for a successful organisational change is for the management to communicate why the change needs to be done. It also implies that the managements need to take the first step and wish for the change to be made for it to be achievable.

When teaching about sustainable development, there are other challenges. Not only the understanding is important, but also the changes in behaviour that occur. It is not enough with a basic knowledge to make a behavioural change happen. Sometimes the acquired change is changes in values or questioning of one's paradigms. Depending on which levels of learning occurs, the tendency for behavioural changes will alter. The lower levels of learning will only provide basic knowledge and normally does not influence the behaviour. Sterling (2004) describes the different levels of learning and their correspondence with changes for sustainability. Furthermore, different response levels to education, as accommodation, reformation and transformation depends on which kind of learning that is involved. The reason for this connection is that learning new knowledge commonly only leads to accommodation or no change at all, whereas only higher level of learning can lead to changes in paradigms (Sterling, 2004).

The evaluation part of learning is often forgotten or hard to estimate. During an education, especially short ones, it is easy to see the opportunities and be positive. But how much remains back in the ordinary working life? Furthermore, it is unclear whether the response and changes made after an education differs depending on

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<sup>1</sup>“Miljödiplomering” in Swedish

preconditions or other factors. As the basic environmental educations only have the duration of half a day, the educators do not have any opportunity to see the long-term response and outcome. Many basic educations, one of them Ekocentrum's, have been around for many years and it is no easy way to know if they still correspond with the demand of the participating organisations.

## **1.2 Aim**

The purpose and goal is to find what affects the outcome of an environmental education, beside the actual set-up and content of the education. The outcome of the study can be used in the development of future environmental educations and if there is need to change the extent or target group of the education for optimal result. Thereby, the aim of the study is to investigate the effects of Ekocentrum's education and during what conditions this education, and similar ones, gives the desired effects and changes.

## **1.3 Research questions**

1. How does Ekocentrum's environmental education affect the work places that have participated regarding the suggested changes from the education?
2. Which factors influence the effects of Ekocentrum's environmental education and how much influence do they approximately have?

## **1.4 Delimitations**

This study has the following delimitations; it will only evaluate Ekocentrum's basic environmental education and the educational aspects will not be investigated.

The factors that will be investigated and be part of the survey are primarily those which are sufficiently distinct to easily establish from survey responses. For example, there would not be an underlying investigation of the participants change of attitude after the education. Among the investigated factors, only those found to have a largest impact on the effects will be analysed further.



# 2

## Theory

The following chapter includes earlier research in subjects related to the study. First, environmental awareness within SMEs is presented followed by different kinds of learning and organisational changes. It is used to support the discussion and conclusion. Finally, this chapter includes a background for the methods used and theoretical motivations for those.

### 2.1 Environmental awareness in SMEs

Small and medium-sized enterprises (SMEs) are companies with less than 250 employees. Gadenne et al. (2009) summarize some of the research regarding the environmental awareness and environmental practices in SMEs. They conclude three mayor motivations for environmental responsiveness: competitiveness, legislation and individual concern. Although SMEs have small impact on the environment one by one, their total impact is bigger as they are many and it is important that they are sustainable. Furthermore, it has been shown that environmental behaviour often leads to cost benefits for SMEs, mostly due to waste minimisation. It also makes way for advantages when competing for costumers, which are further economic benefits. (Gadenne et al., 2009)

The environmental awareness of SMEs managers is mainly determined by the access to information, time and cost factors and the managers personal orientated factors (Gadenne et al., 2009). The study by Gadenne et al. (2009) showed that cost and time issues lead to lower environmental awareness which leads to more environmental practice. The other causes were not proven by the study. It also showed that high awareness develops if the manager believed that the environmental legislation is relevant or that it is important to suppliers.

### 2.2 Levels of Learning and Levels of Response

Bateson (1972) states that learning implies changes, changes in how a person understands the world and acts thereafter. To understand learning, it is important to understand what learning is not; *zero learning* is a kind of learning that is no real learning. Zero learning is like using already known knowledge in new situations. By using only zero learning, no new learning will take place. But through doing “trial and error” and base the trial on previous knowledge, learning will occur; different kinds of learning based on which kind of error is made.

The first level of learning is described as change of the response from a given set of alternatives to correct an error (Bateson, 1972). An example is when the response from a stimulus is changed over time, like with Pavlov's dogs and classic behaviourism (Phillips and Soltis, 2014). Further, this level of learning can be described as doing things differently, or as Sterling (2004) puts it "doing things better". No new behaviour or opinions occur but the already used ones are applied in new ways or from different stimuli.

The second level of learning is when the process of the first level is changed; the set of alternatives from which to choose from when correcting errors is changed (Bateson, 1972). This leads to bigger changes and reformation of how things are done. Sterling (2004) explains it with "doing better things" and including new values or ideas.

The third level of learning is when the system of sets of alternatives are changed, which can be hard to understand or explain (Bateson, 1972). The change of the learning is transformative and leads to changes in paradigms and basic opinions. This level of learning alters our feelings and view of the world and can be described as "seeing things differently" (Sterling, 2004).

Connected to the levels of learning there are also different levels of response; correlating levels of which changes are made due to the learning experience. According to a model by Sterling (2004) there are four levels of response. These levels of response correlate directly to no learning and the three mentioned levels of learning. The first level of response does not correlate to a level of learning, as it does not result in any response or changes. Denial or ignorance can be the reason that no learning and hence no response take place. The second level of response, resulting from first order learning, lead to additions of new ideas or smaller changes to the existing system, without any real changes in the system. It is a content-orientated response and focus on small changes that easy can be added to the system, called build-on changes. The third level results in significant changes, embedded in the existing system. The system is changed but remains mainly the same with modifications on the paradigms. The focus lies more on changes for a better system then changes for the sake of changes and is called build-in changes. The fourth level of response is transformation, the whole system and its paradigms are changed. This requires a bigger insight and revelation that forces the change of the complete paradigm.

To achieve a higher level of learning, and thus response, the participants must be open to changes and preferably have experienced paradigm or built-in changes before. To changes one's paradigms, the reasons need to be good and convincing. It will not occur any big changes if the participants do not find anything wrong with their existing systems (Sterling, 2004).

### **2.3 Communication as a tool for organizational change**

There are a lot of causes influencing whether an organisational change will be successful or not. According to Kotter (2012) there are several steps that needs to be managed well, otherwise the change will result in unnecessary work and pain.



Kotter's steps are a model adapted to the most common reasons for failure when implementing changes in organisations. These reasons are often in bottom bad communication; employees learning about the change not from the management but other sources or numerous inaccurate rumours about the changes (Smeltzer, 1991). These circumstances reinforce the importance of communication from the management to the employees (Richardson and Denton, 1996).

A final reason for failure that Smeltzer (1991) emphasises is the managers focus on "lean" methods of communication rather than face-to-face techniques. Richardson and Denton (1996) further states that no matter which change is being made there will always be some ambiguity, doubt, anxiety and fear associated with any major change.

## **2.4 Methodology**

This section covers the theoretical motivations for the methods used. It explains the design and aims to help in understanding the results.

### **2.4.1 To design a survey**

How to design a survey is described by Brace (2013). He states that the important part to start with is to know which types of answers and data that is desired for the following analysis. Nominal data, with discrete categories, are often used for parts of the data, such as gender or position. Other types of data are interval scales, which provide a scale where the respondent can rate things whereas age and time since they participated in the education will result in ratio scales.

A survey is a medium of remote conversation between the researcher and the respondent, and as such, it is important that the language used is easy to understand and the questions simple. Furthermore, questions with open replies will if possible be introduced before multiple choice questions. That will allow the respondents to reply without being influenced by the alternatives of the following questions. A survey should begin with behavioural questions before questions about attitude or opinions. All categorizing questions should be in the end, if these are not required to determine which questions the respondent shall receive. Finally, the layout of the survey will be over looked for a nice appearance to facilitate the participation and possibly raise the number of respondents. (Brace, 2013)

### **2.4.2 To analyse data using statistic**

A common statistics value is the mean value, which is a measurement of the central tendency of a sample. One way to compare different mean values and interpret them is by using ANOVA (analysis of variance) (Montgomery, 2008). ANOVA is an accumulation of different methods that use observed values or probabilities, to calculate for example the linearity and the significance. It is often used because of its ability to compare mean values regardless of the number of experimental variables (Rutherford, 2001). Furthermore, the function of ANOVA is to determine whether the means of the variables differs significantly. This is possible as the error

is included beside the models in ANOVA and by comparing the differences between variables with the error it is possible to establish whether the result is significant (Rutherford, 2001). A significant result is more important and safer to trust in. A common guideline is a value of significance under 0.05 (<5%), which implies that the result would be correct in 95 % of all cases (Montgomery, 2008).

The effect size of the models from ANOVA is often determined with a coefficient of determination which in ANOVA are denoted  $\eta^2$  and in regressions with  $R^2$ .  $\eta^2$ , also known as the magnitude of effect, is divided in three categories based on size: small, medium and large effects. The intervals for the categorisation can differ, but one common interpretation originally from Cohen (1988) is:

- small :  $\eta^2 > 0.02$
- medium :  $\eta^2 > 0.13$
- large :  $\eta^2 > 0.26$

This is only one interpretation and should be considered a guideline and not a rule.

Logistic regression is used when investigating the correlations between one dependent variable and several independent variables. One type is binary logistic regress, where the dependent variable only can have two values. This is a good analysis when comparing a variable with only two groups, like gender. If the dependent variable has more than two values multinomial logistic regression can be used instead. It works basically the same but the dependent variable can have an unlimited number of values. (Montgomery, 2008)

### 2.4.3 To design and perform interviews

There are different forms of interviews which all have pros and cons. One form is semi-structured interviews. According to Gillham (2008) there is a balance of structure and freedom when using a semi-structured form of interview. The structure of the interview is both the limitations, such as time and place, and the prepared questions, whereas an example of freedom is the possibility of the interviewee to answer freely without restrictions. It is also a desirable advantage that it allows follow-up questions for more detailed information.

To raise the chances of a successful interview one should gather and analyse information regarding the interview topic beforehand (Dilley, 2000). Dilley (2000) further suggest that interviews should start by putting the respondent to ease and establishing his or her ability to answer by using closed-ended questions such as; "Where did you go to college?" or "What year did you enrol?".

"Ideally this [first] question will demonstrate your preparedness. It should flow directly from your announced purpose and it should be easy to answer"

- Dwyer (1996, p. 18)

# 3

## Methods

This chapter presents the methods with which the study was performed. The goal of the study was to find the effects of an environmental education and the factors which influence these changes. After conducting a case study of Ekocentrum's environmental education, a survey was distributed to previous participants of the education. The survey was the main source of data which was analysed using SPSS. Finally, interviews, used as a complement to the survey, were conducted and analysed.

### 3.1 Pre-study

The first step was to compile the possible effects from the education and the factors causing these effects. The investigation started with a literature study, followed by observations of Ekocentrum's education and ended with the survey. The case study of the education and the conduction of the survey are described later in this chapter. The possible effects of the environmental education used in the study are shown in Table 3.1 and the possible factors for changes are shown in Table 3.2. The factors were used to categorise the respondents in different groups for the analysis.

To get information about Ekocentrum's environmental education a case study<sup>1</sup> was conducted. The case study was not used for construction or confirmation of the result but only for the selection of the effects in Table 3.1. Three separate education events were observed to learn the content and thereby find the possible effects after participating. This was the main source of information about the influences of the education that were further investigated in the survey. The result of the observations of the education events are summarised in Chapter 4.

### 3.2 Survey

The main source of data from different organisations' effects and underlying factors, was collected using an online survey. The main purpose was to find effects caused by the education and which factors lead to different amounts of effects. Since no similar studies have been found there were no appropriate existing surveys to take inspiration from. Therefore, this project is considered a pilot study of the subject and *Questionnaire design: How to plan, structure and write survey material for effective market research* by Brace (2013) was used as a guideline for the setup of the survey as

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<sup>1</sup>In this project, case study refers to personal observations of the education event.

### 3. Methods

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**Table 3.1:** Presentation and explanation of possible effects and changes in the organisations after attending the education.

Effects	Explanation
Materials	Changed mindset when choosing materials, like chemicals or cleaning supplies
Purchases	Changed purchases to decrease the wastage
Consumables	Decreased the use of consumables, like throwaways or hardcopies
Recycling	Started or increased recycling of waste
Energy sources	Changed energy sources to renewable alternatives
Water use	Working active to decrease the water use
Beehive	Own or sponsor a beehive
Further education	Supply further environmental education for the employees, intern or extern
Cycle Flow	Increased awareness of ecological cycle, using products like <i>cradle to cradle</i> or <i>Circular economy</i>
Other	Possibility to add changes not included, for example <i>environmental cafés</i> or an own garden plot
Fuel	Changed the fuel used in the organisations vehicles to more pro-environmental options
Long transport *	Changed mindset when traveling longer distance, for example taking the train instead of flying
Short transport *	Changed mindset when traveling short distance, for example using bus or bicycle instead of car
Personal **	Changed made outside work or a different mindset

\* Not asked to all participants, see Appendix A

\*\* Not included in the statistic analyses

**Table 3.2:** Presentation of the factors which were investigated, including breakdown in categories.

Category	Factors
Organisational	Organisation
	Size
	Environmental certified
	Environmental coordinator
	Time since education
	Earlier participation from organisation
Individual	Position in organisation
	Gender
	Age
	Time at working place
	Education
Attitude	Make difference
	Changes outside work
	Attitude to changes
	Attitude to environmental changes
	Feeling participation in environmental work
	Obligated to attend education
	Feelings before education
	Fulfilment of Expectation
Feelings after education	

well as the primary inspiration for the questions. Furthermore, the questions were chosen and formulated over a pair of iterations with the different supervisors of the project. Questions with open replies worked as a complement to the questions with alternatives and to find effects or factors that was not contemplated when constructing the survey. Further complement to find additional factors or effects was the given possibility to motivate previous answers. The survey was designed in the software *Webbenkäter*. The complete survey is presented in Appendix A.

The survey was distributed by link via e-mail to all organisations that have participated in Ekocentrum's environmental education during either 2015 or 2016. The recipients of the mails were asked to pass it forward to other in their organisations. The mail was sent to 135 different addresses with a total of 217 ordered educations, 99 specific education events. If all respondents were to pass the survey forward the maximum number of participants would be unclear but were estimated to be around 1000. 20 of the 135 addresses did not work, due to not existing or temporary paused. This corresponded to 18 booked education events, and part of 17 more as some events were with more than one organisation. The time they had to answer the survey was two weeks. At the middle of the second week a letter of reminder was sent. The original message and the reminders are shown in Appendix A.2.

The analysis of the survey data was conducted in SPSS. The data was sorted and the different answering alternatives were given appropriate values. The different effects, with a maximum total of 13, were summed to give every recipient a value of their amount of effects done. All analyses were performed on individual level due to limitations from the used factors. The summation of changes was used to calculate mean values of changes due to different factors, which significance was investigated with ANOVA. Moreover, different kinds of logistic regression were used to investigate the relationships between the effects and factors as well as test for correlations between the factors.

### 3.3 Interviews

Following the survey, the organisations which had responded were contacted regarding participation in an interview. Seven managers or environmental coordinators from different organisations were interviewed separately. The interviewees were volunteers from organisations fulfilling two criteria: someone from the organisation needed to have responded to the survey and the organisation needed to be within travel distance. The interviews, see Appendix B, were conducted with both members of the project present. The interviews were later transcribed and analysed with two purposes: finding common points of effects or factors, and finding quotes of interest to emphasise results from the survey analysis.

The analysis of the interviews was made in two steps: Firstly, each interview was fully transcribed and then split into smaller segments. These segments were split by the question asked and consisted of shorter phrases and quotes given by the interviewee. Secondly, the quotes from all interviews were organised by their similarities with each other and then placed under two categories: effects and factors not primary investigated in the survey or quotes connected to the survey.

# 4

## Case study: Ekocentrum

The following chapter will describe environmental educations in general and Ekocentrum's basic environmental education in more detail. The chapter is created based on a case study conducted at Ekocentrum and is based on personal observations. The project group auscultated the education three separate times to get a better view of the content and if it could vary. The observations were not a source of result for the study but a way for the project group to get an understanding of which effects that could be a direct or indirect consequence of participation in the education.

One of the requirements for an organisation to receive or keep their environmental certificate is that every employee must participate in a basic environmental education. There are several providers of environmental education in Sweden, and in Gothenburg, where environmental certification started. There are no rules for the setup and the content are relatively flexible. To qualify as a basic environmental education, it needs to include the following three topics: 1) the earths ecosystem, 2) our lifestyle, ecological & social sustainability and 3) society's environmental work. The first includes examples such as climate change, biodiversity and ecological footprints. The second includes how our lifestyle of consummation and use of resources affect the sustainability of our planet. The last topic relates to the current laws and environmental goals both of EU and Sweden.

The education at Ekocentrum is usually split into three segments and the content differs slightly depending on the educator and participants. Some of the education events are open events. These are not ordered by a particular organisation but is open for anyone to sign up for; often employees that missed the organisation's own educational event or organisations too small for an own event. Thus, these sessions are more focused on an individual level rather than the organisational. The three educational events observed all took 4 hours and followed the structure described below.

The education starts with an inspirational session of causes and effects of some of today's global and local environmental challenges. Examples from the organisations impact are mixed with examples from Ekocentrum's own work and captivately truths about the current situation. The participants are introduced to how their and others' choices, both privately and in their work life, affect the environment. Some examples of more unknown causes are the water consumption in cloth manufacturing and foreign meat production and the deforestation in among others the Amazon due to production of palm oil and soy bean. The first part ends with a more global explanation, either about the greenhouse effect or more general with the *Limits to Growth*.

The second part of the education event is conducted in Ekocentrum's exhibition, where different companies exhibit how they work towards a sustainable future with a local approach. It can be anything from companies working with alternative fuel to companies building *passive houses*, a kind of low-energy houses. Some of the more highlighted parts in the exhibition are the *waste staircase*, the ecological footprints and small ecosystem in demijohns<sup>1</sup>. The waste staircase describes how to reduce the amount of garbage by for example recycling and reusing, both privately and in the organisation. The footprint highlights the over-consumption of the resources of the earth while the ecosystems emphasize the importance of cycle flow in the nature as well as on the whole planet.

The final section is more flexible and focused on the participating organisation and their specific environmental work. Other common discussion points are which of the UN global goals the organisation affect and in what way and further discussion about footprints. One of the participated organisation from the observed events was just starting their environmental work to get their certificate and therefore spent this time discussing their organisations environmental goals and how they affect the environment. Another organisation was already certified and thus spent the time discussing how their work was progressing and which future changes they could make. The whole educational event ends with emphasize that everybody can make a difference and that the choices made can make a difference. This is also a common feature throughout the whole event.

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<sup>1</sup>Glass container with a particular shape typically used for transportation of liquids or in-home fermentation



# 5

## Results

In the following chapter, the result of the study is presented. It primarily originates from the survey and the following analysis which are presented below. The chapter also includes some complementary result from the interviews.

### 5.1 Summary of the survey and the different factors

A total of 130 people started answering the survey while 76 of those completed it. Those originated from a total of 37 different organisations, with a maximum of 10 participants from the same organisation. All that fulfilled the survey answered on the open replies questions. The factorial questions were used to divided the respondents into groups, see Table 5.1 for the factors. The groups were used to find patterns of effects due to the groups common factors. Furthermore, the factors were divided into three categories: organisational, individual and attitude and the following result will be presented according to these categories.

The first category was the organisational. 60.5 % answered that their organisation was between 10 and 50 employees, 23.7 % reported a size between 50 and 250 people, 10.5 % answered less than 10 employees and 5.3 % stated that their organisation had more than 250 employees. Regarding environmental certification, 80.3 % stated that their working place was certified, 13.2 % that it was not and 6.6 % did not know. 81.6 % of the participants had an environmental coordinator at their working place, 7.9 % did not and 10.5 % did not know. The most common time since the respondents had participated in the education was more than 2 years ago (23.7 %) and one year ago (23.7 %), followed by one and a half year ago (18.4 %), a half year ago (14.5 %), more recently (11.8 %) and 2 years ago (6.6 %). Most of the respondents stated that others from their organisations had participated in the same education earlier (84.2 %).

Regarding position in the organisation, 22.4 % were in management, 21.1 % worked as environmental coordinators and 55.3 % reported other positions. Concerning gender, overall 57 % were women. In management 18 % are women and 81 % of the environmental coordinators are women. The most respondents were between 45 and 54 years old (35.5 %), followed by 35 to 44 (27.6 %), 55 to 64 (15.8 %), 25 to 34 (15.8 %), a few were younger than 25 years (3.9 %) and last one over 65 years old (1.3 %). The majority with 34.2 % had worked less than 2 years in their current working place, 28.9 % 2 to 5 years, 18.4 % 5 to 15 years and 18.4 % more than 15 years. Most of the respondent had their highest education from university

**Table 5.1:** Presentation of the factors which were investigated, including breakdown in categories.

Category	Factors
Organisational	Organisation
	Size
	Environmental certified
	Environmental coordinator
	Time since education
	Earlier participation from organisation
Individual	Position in organisation
	Gender
	Age
	Time at working place
	Education
Attitude	Make difference
	Changes outside work
	Attitude to changes
	Attitude to environmental changes
	Feeling participation in environmental work
	Obligated to attend education
	Feelings before education
	Fulfilment of Expectation
Feelings after education	

(71.1 %), followed by gymnasium (22.4 %) and vocational education (6.6 %).

The last category of factors concerned the participants' attitude toward sustainable development and the environmental education. All participants of the survey acknowledged that there exist environmental problems in the world but only 90.8 % thought that they could make a difference for the environment through their actions. Due to the environmental education, most participants decided to make some changes outside of the work. Most respondents' thought that change in their organisation was developing, some thought it neutral and only one as a waste of time. Changes in the organisation for a better environment got even higher positive response. Almost all participants felt participatory in their organisations environmental work (90.8 %) and many of the participants attended the education willingly (73.7 %). Before participating in the environmental education all respondents felt positively towards it, with 36.8 % of the participants feeling expectant, 22.4 % neutral and 40.8 % a mix of expectation and neutrality. Most respondents felt that their expectations of the education were fulfilled (96.1 %). After the education, their feelings ranged from positive (64.5 %), positive and neutral (31.6 %), neutral (1.3 %) to neutral and disappointed (2.6 %).

**Table 5.2:** Presentation and explanation of possible effects and changes in the organisations after attending the education.

Effects	Explanation
Materials	Changed mindset when choosing materials, like chemicals or cleaning supplies
Purchases	Changed purchases to decrease the wastage
Consumables	Decreased the use of consumables, like throwaways or hardcopies
Recycling	Started or increased recycling of waste
Energy sources	Changed energy sources to renewable alternatives
Water use	Working active to decrease the water use
Beehive	Own or sponsor a beehive
Further education	Supply further environmental education for the employees, intern or extern
Cycle Flow	Increased awareness of ecological cycle, using products like <i>cradle to cradle</i> or <i>Circular economy</i>
Other	Possibility to add changes not included, for example <i>environmental cafés</i> or an own garden plot
Fuel	Changed the fuel used in the organisations vehicles to more pro-environmental options
Long transport *	Changed mindset when traveling longer distance, for example taking the train instead of flying
Short transport *	Changed mindset when traveling short distance, for example using bus or bicycle instead of car
Personal **	Changed made outside work or a different mindset

\* Not asked to all participants, see Appendix A

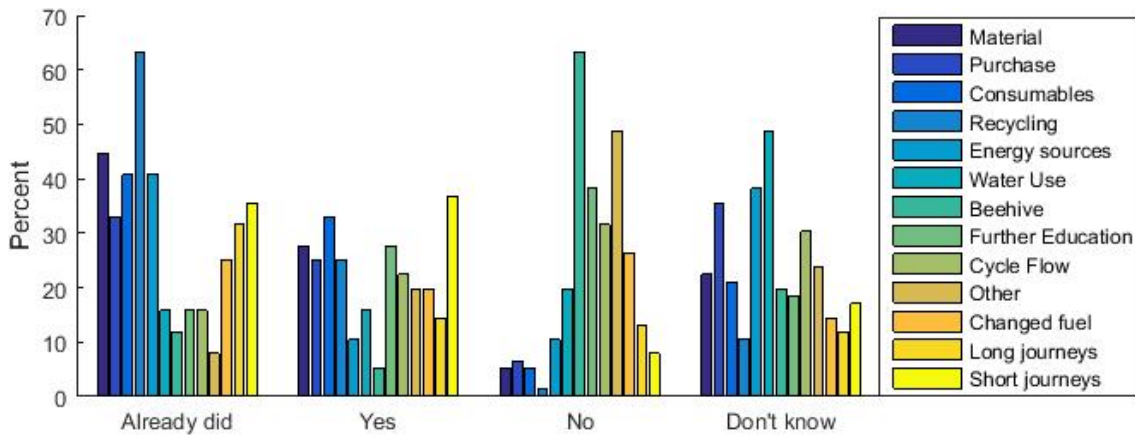
\*\* Not included in the statistic analyses

## 5.2 Environmental effects due to the education

The effects investigated in the study are shown in Figure 5.1 and Figure 5.2 and are explained further in Table 5.2. Figure 5.1 shows the result sorted by the answers and Figure 5.2 sorted by the effects. A total of 290 ‘‘Already did’’, 215 ‘‘Yes’’, 211 ‘‘No’’ and 237 ‘‘Don’t know’’ were collected which give a total of 953 answers. All respondents were treated as individuals, regardless if there were from the same organisations or not, since answers by participants from the same organisations did not correspond well with each other.

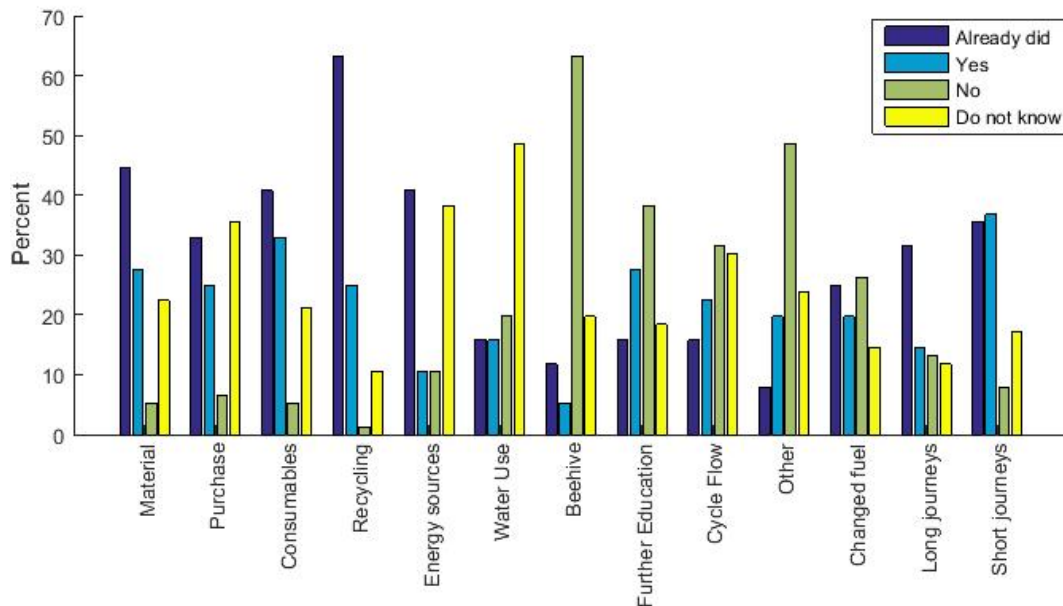
The environmental practices are divided into practices implemented before and after the education, as both ‘‘Already did’’ and ‘‘Yes’’ imply that the organisation have said practice. Of the total environmental practice, the most common practices in the organisations are related to purchasing, use and disposal of supplies followed by changed policy with shorter journeys and using energy from renewable energy sources. All these practices were stated as implemented by more than 50 % of the respondents. The least common among the SMEs were to partake in sponsoring a

## 5. Results



**Figure 5.1:** The amount of different effects, which environmental practices have been initiated or not after the education. Sorted in regard to the four different answering alternatives.

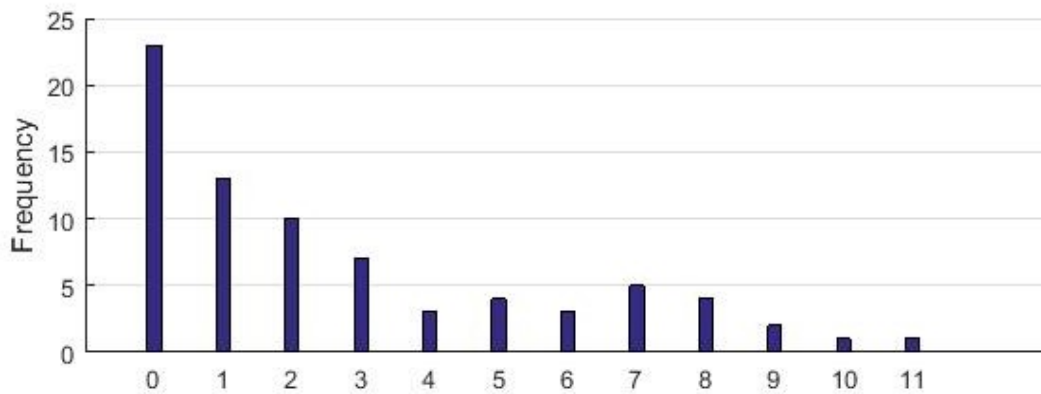
beehive and the effects named as others, both with a total answering percentage that implied practices below 30 %.



**Figure 5.2:** The amount of different effects sorted in regard to the different environmental practices.

The answer “Yes” interprets as an effect after the education while the rest corresponds to no changes due to the education. A summation of effects done was used in the analysis where the possible maximum amount of effects was 13, whereas the maximum amount reached was 11. Neither the answers from open replies nor the personal changes are included in the summation of effects. The summations of the effects are shown in Figure 5.3.

In addition to the changes asked for in the survey other effects have come forth



**Figure 5.3:** Displaying of how many participants that have reported each amount of effects. Everyone are regarded as individuals regardless if there are many participants for the same organisation.

from the open replies. It emerges that the effect that most respondents regard as the most important are the changed mindset at the working place. The education gives everybody a common base for environmental discussions and practices. 8 recipients stated that the education initiated work towards an environmental certificate. About one third of the participants answered that no change had taken place after their education, often due to already ambitious environmental practices. Regarding the respondents' personal view to sustainable development, the largest change seems to be an increased awareness; both towards the global situation and how much difference small changes can make for the environment. One of the interviewees stated "When the last 3 participants [of the education] returned to work they seemed inspired and started discussing the earth's resources."

### 5.3 Factors that influence the effects of environmental educations

The factors that have been investigated in this study are shown in Table 5.1. Beyond these factors, a few others emerged from the open replies in the survey. Many participants (33.3 %) stated that an awareness regarding environmental issues was the main factor for successful effects. It was followed by demands from the organisation, management or customers (24.5 %), the education itself (19.3 %) and lack of time (5.3 %). Beside the mentioned reasons many participants did not know any reasons or did not answer at the open replies questions.

Some of the factors in the survey, showed in Table 5.1, have been found to have impact on the effect. None of the factors regarding the whole organisations showed any interesting affects since the answering frequency was to low and irregular to compare different organisations with each other, especially as there was only a single respondent from the majority of organisations. The size of the organisation had a small but insignificant effect ( $\eta^2=0.023$ ) with most changes in the smallest and biggest organisations. The mean values from the question asking about environmental certification are shown in Table 5.3 and had a small effect on the amount

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**Table 5.3:** Presentation of analysis if an environmental certificate influence the effects of the education. The appurtenant ANOVA showed no significance.

Is the organisation environmental certified?	Mean	N	Std. Deviation
Yes	2.64	61	2.955
No	4.20	10	3.490
Don't know	1.40	5	1.673
Total	2.76	76	3.002

**Table 5.4:** Result of the analysis of the amount of effects due to the participants' positions in the organisations. The analysis in ANOVA showed a linearity significance at 0.022.

Position in the organisation	Mean	N	Std. Deviation
Management	4.06	17	3.455
Environmental Coordinator	2.81	16	3.167
Other	2.10	42	2.516
Total	2.69	75	2.959

of changes ( $\eta^2=0.042$ ) but no significance. Having an environmental coordinator did not affect the mean values of the amount of effects. Neither the time since the education nor if the organisation had attended the education earlier affected the amount of effects noticeably.

Many of the factors were chosen to categorise the participants to find common patterns for a high number of changes due to the education. The position in the organisation has an effect on the amount of effects after the education, as seen on the mean values shown in Table 5.4, with a large effect size ( $\eta^2=0.72$ ) and significant results (0.022). The gender has some influence on the effect of the education, see Table 5.5, with only a small effect size ( $\eta^2=0.028$ ) and a linearity significance at 0.154. The age, see Table 5.6 for mean values, show poor linearity ( $\eta^2=0.011$ ). Some better regressions were made with quadratic curve estimations ( $\eta^2=0.059$ ) with a significance at 0.11 and a coefficient significance at 0.41. The time at the current working place seems to have bigger influence on the amount of effects. The means for the different categories can be found in Table 5.7 and with just under medium size effect ( $\eta^2=0.125$ ) and a significance at 0.006. The participants level of education had low measured association and showed no significance, but the mean values differed some and are shown in Table 5.8.

**Table 5.5:** The different mean values of effects form the education depending on the gender of the participant. The ANOVA showed poor significance.

Gender	Mean	N	Std. Deviation
Male	3.38	32	3.405
Female	2.37	43	2.628
Total	2.80	75	3.005

**Table 5.6:** Presentation of how the age of the participant influence the amount of effects after the education.

Age	Mean	N	Std. Deviation
Younger than 25 years	1.67	3	2.082
25 to 34 years	1.25	12	1.357
35 to 44 years	3.29	21	3.133
45 to 54 years	3.41	27	3.544
55 to 64 years	2.42	12	2.466
65 years or older	0.00	1	0.000
Total	2.76	76	3.002

**Table 5.7:** Showcasing how the participants' time at their current working place impact the amount of effects of the environmental education.

Time at current working place	Mean	N	Std. Deviation
Less than 2 years	1.50	26	2.302
2 to 5 years	2.73	22	2.548
5 to 15 years	4.29	14	3.646
More than 15 years	3.64	14	3.388
Total	2.76	76	3.002

**Table 5.10:** Presentation of the participants' feelings prior to the education influence on the amount of effects.

The feelings before the education	Mean	N	Std. Deviation
Expectant	3.46	28	3.203
Expectant/Neutral	2.61	31	3.041
Neutral	1.88	17	2.421
Total	2.76	76	3.002

The factors concerning the respondents' attitude towards the education, environmental practice and changes did not result in any clear trends. The respondents who thought they could do a difference had a higher amount of changes (see Table 5.9), with small effect ( $\eta^2=0.055$ ) and a significance at 0.042. The attitude towards changes did not seem to affect the amount of changes done and the attitude towards changes for environmental benefit showed even less influence. The mean values of amount of changes due to the participants' feelings before are shown in Table 5.10. Higher expectation result in a higher expected amount of effects, with a small effect size (0.041) and significance at 0.082. If their expectations were fulfilled or not does not show any strong impact on the effects of the education and neither does the respondents' feelings afterwards.

Efforts were made to perform logistic regressions. Both binary logistic regression and multinational logistic regression were tried without any significant result.

A reason for differences between the organisations that emerge from the interviews, is how they work with their continuous environmental work. In some organi-

## 5. Results

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**Table 5.8:** Presentation of analysis if the participants' level of education affects the amount of environmental practices implemented after the education.

Highest finished education	Mean	N	Std. Deviation
Gymnasium	3.24	17	3.133
Vocational Education	2.80	5	3.114
University	2.61	54	2.993
Total	2.76	76	3.002

**Table 5.9:** Result of the analysis if the participants' opinions if they could make difference or not affected the outcome of numbers of effects after the education.

Can you make a difference?	Mean	N	Std. Deviation
No	0.57	7	1.134
Yes	2.99	69	3.046
Total	2.76	76	3.002

sations, there is an environmental group working together, though it differs who is in the group. Either they include volunteers among the employees or the managers of the organisation. Another situation is when there is a single person working, either full or part time, with the environmental work of the company. In these cases, it differs what type of mandate and authority they have in their work.

Other factors that were harder to influence were noticed in open replies in the survey and from the interviews. In several organisations, it is not possible to recycle material in all fractions or to recycle food. One reason is that the landlords do not have the necessary routines in their facility. One interviewee said "These are not our locales, we are renting, so we have a low possibility of influencing our environment". Regarding composting in the organisation, another interviewee answered "It has been a long process against our landlord. So, we could not do that [composting] before a year or two ago, and it was a very long process...". In some cases, the organisations succeeded to find their own solution to the problem or in convincing their landlords to cooperate whereas some did not bother trying to change the situation.



# 6

## Discussion

The following chapter discuss the outcome and results of the project. It begins with reflection about the methods used and continue with discussion of the result and research questions. Due to the limited data, the discussion and conclusions are to be considered a possible answer to the research questions. For more accurate results a more extensive study should be conducted.

### 6.1 Evaluation of the Method

The main source of data was the survey. The construction of it was satisfactory and it gave a large amount of data to the study. The implementation of the interviews gave some result complementing the survey in a few aspects.

Both the survey and the interviews were conducted in Swedish. This could be a cause for errors due to the translation of the questions and answers to English. However, even bigger errors could have occurred if especially the interviews were conducted in English. Furthermore, to have the survey in English could have been a further cause to lowering the response rate.

#### 6.1.1 The Survey and Analysis

There could be many reasons for the survey's low response rate. The most obvious is the fact that the mail with the link to the survey was not sent to all possible participants, but only to the ones which had ordered an education event. We were forced to rely on them to pass the mail forward to the other in their organisations, due to lack of addresses to more people. Although this was not a perfect way of distributing the survey there were not any alternatives, as only letting the ones who booked the events participate would give even less data. Moreover, some answers make us think that the mail-text, see Appendix A.2, could have been misinterpreted and thus not forwarded as intended. Another reason, shown in previous studies, could be the difficulty to make SMEs participate in research which make a low response rate expected (Macpherson and Wilson, 2003). The limitations of the study required that most of the participants were from SMEs and like before there were not any alternatives. An alternative for control of the result is to find personal addresses or phone numbers to random participants of the education and ask some control questions. One of the reason this was not conducted is the limited record Ekocentrum has of former participants. The only data they have are name and e-mail addresses of the people which have booked the education events. If the control

questions had been asked to a totally random person on one of the participating organisations it is not sure if the person already had answered the survey or even participated in the education.

The design of the survey was good but could have been even better. It was designed according to the work about questionnaires by Brace (2013). The survey was easy to answer to as the questions were formulated to ease participation. In excess, an effort was made to make the data from the survey to be easy to analyse. This did not succeed perfectly, mainly due to lack of knowledge of the analysis methods. The main problem regarding the framing of the data was that most of the factors were individual whereas the organisational effects should be the same for a whole organisation. This problem got even more severe as the effects stated from the participant from the same organisation did not match up, and as it only was one respondent from many of the organisations. Thus, the data, as well as the selection of analyses, had to be modified to be useful in the analysis. Furthermore, the survey was on the limit of taking too long time to participate to; with a more substantial preparatory work it should be able to abbreviate.

The participants were chosen based on the wishes from Ekocentrum to find out how their participants had changed their organisations after attending the education. The contact information to these organisations was a further advantage. An alternative would have been to include people which had participated in other environmental education and be able to compare the effects due to different educations, such as the effect of different setup for the education. The spectrum of answers would have been broader as well which could have given room for more findings from the result.

Due to the problem with the data and the limited responses the analyses did not go as planned. It turned out that the factors investigated only had small or none effect on the changes made. There could be different reasons to the low effect rate. The most obvious is the selections of factors; there are clearly additional factors that affects the education. Some of them emerges from the open replies and interviews and will be discussed later in this chapter. Other reasons to the difficulties with the analysis could be the low response rate, which did not give enough data for a more robust investigation. The scattered response levels from the different organisation could also have affected the possibility for analysis.

One reason for the scattered responses within the same organisation could be that the management and the environmental coordinators have a much better insight in the organisation's environmental work. Even in small organisations like most of the ones in this study, it is hard for everybody to know about everything. This should be the most logic reason for the high amount of "Don't know" as an answer to which changes have been made and the reason to the diversity of answers within the organisations. Another reason for the varied responses could be because some of the respondents have joined the organisation after the majority of changes had already been implemented. One possible solution in future studies could be to only let management or environmental coordinators participate. Then data would then only include on response from each organisation. The downside with this alternative is that it is not possible to investigate the effects relative the position in the organisation.

### 6.1.2 The Interviews

The purpose of the interviews was to gather in depth data regarding organisations environmental changes and which of the effects were due to the environmental education. Therefore, the interviewees were employees or managers with insight into the organisations environmental work. The interviewees were volunteers from organisations fulfilling two criteria: firstly, someone from the organisation needed to have responded to the survey and secondly, the organisation needed to be within travel distance. The reason for the first criteria was to ensure there were some basic data regarding the organisations environmental work beforehand while the second was to prioritize face-to-face interviews.

These conditions allowed the possibility to spend less time on superficial questions and more on the in-depth environment and situation of the organisation that might affect the environmental work and effects of the education. The second criteria limited the organisations within a specific geographical area, which might be argued would influence the results. There are two different angles. Either the results could be influenced based on the similarities of the type of organisations which are present within the geographical delimitation. The other viewpoint was that organisations and employees in different geographical areas have different view on change and therefore, it might affect the results. In the first case, the geographical region where the project was completed is a large region filled with a large diversity of organisations. Therefore, it should not have affected the result. On the other hand, the culture between organisations and how they handle organisational change might differ quite a lot, not only on a global scale but even in a smaller regional area. Instead it depends heavily on the leadership and how they implement the change. It is therefore quite likely that the limited geographical area where the interviews were conducted have affected the overall result of the interviews.

Another criterion that should have been considered more properly was how many from the organisations that had participated in the survey and if the intended interviewee had participated. From some of the organisations of the interviewees the respondents had not even completely fulfilled the survey, which resulted in very limited data to adapt the interview questions. One reason this criterion was not considered more sincere was the low response rate of the survey which made it hard to find organisations with enough participants and where the environmental coordinator was willing to participate in an interview.

In the early planning phase, the opportunity to have both a survey and interviews seemed to be the perfect way to combine a quantitative and a qualitative study. The aspect that was not considered during the planning phase was the open replies. From the start the plan was to have a combination of open questions and closed questions in the survey to get a combination of quantitative and qualitative data. The aim with the interviews was that they should contribute to gather in-depth, qualitative data as a complement to the survey data. As it turned out, the open replies in the survey succeeded to deliver the qualitative data by itself and the data from the interviews turned out to be used only as a verification that it was correct. Therefore, it would have been wise to evaluate the need for interviews after analysing the survey answers. As all respondents answered to the open replies it should have been clear that interviews would not give the amount of complementing data to make them

worth the effort. Instead, there should have been a criterion for the cancellation of the interviews. An example of this criteria could be that if a certain percentage of the respondents had given suitable replies to the open questions the interviews would be cancelled. The result of that would have been that more time could be spent on analysing the survey data rather than the interviews.

### 6.2 Effects after the Education

The most significant effects from the education appears to be the increased environmental awareness and a changed mindset which gives more opportunities for discussions at the workplace. This is in accordance with the wishes from the educators at Ekocentrum and should thereby be seen as a success. Even if it is not a measurable effect it should result in other effects in the near or distant future. Therefore, it should be regarded as the most important effect of basic environmental educations. Some of the other changes that was more regular was changed policies in regards to short journeys, consumables and materials as well as implementation of further educations adapted for the different organisations, as can be seen in Figure 5.1 in the result. These effects were also common among the measures already done, except further education and with recycling as the most common. The high percentage of "Already did"-answers suggests that these practices more easily comes to mind. Furthermore, as the percentage of recycling in Sweden has increased the last 30 years (Avfall Sverige, 2016) it is reasonable that it is one of the more common environmental practices in organisations. All the effects most often applied or already done are small and easy to transact. The most likely response level corresponding to these changes are the built-on approach (Sterling, 2004). This response to the first level of learning and will not lead to bigger changes. However, the changes regarding the common understanding of sustainable development and changed mindset indicates a higher level of response and thereby learning, as the participants modifies the way they see the world, thus their paradigms.

The distribution between the four different alternatives to answer for which changes had been made were practically equal, as can be seen in Figure 5.1. Besides showing that the changes already made equals the ones made due to the education, it also displays that the amount of "Don't know" is high. This indicate that the internal information regarding the organisations' environmental plans do not meet up with the demand. The employees' bad insight in the environmental work are a problem due to the importance of communication when trying to make changes in an organisation (Richardson and Denton, 1996). This could indicate that the organisations with high amount of "Don't know" will struggle more to succeed with environmental changes, or any changes at all.

Due to the low response rate, it is reasonable to assume that the participants are more pro sustainable development than average. Interest in the topic of a survey have been found to increase the possibility for participation (Groves, Presser, and Dipko, 2004). If only a small part of the sample group has answered the survey they are more likely to have a positive attitude toward environmental awareness and practices and thereby take time to participate. This is further backed up by the fact that all participants recognised that it is an environmental problem in the world

and that the feelings and expectations for the environmental education over all was high. This should result in higher amounts of effects, as the ones that are interested enough to participate in the survey also are more likely to strive for changes for better sustainability and be aware of the ones made. This means that the amount of effects done or already made in the organisations in this study is probably higher than in average organisations. Another source of difficulty for estimation of the effects of the education are the high amount of changes already made. This seems to be mostly because that others from the organisations have already participated in the education or that the organisations already had high environmental awareness prior to the education. The open replies from the survey empower this possibility as many stated that they already had a substantially environmental program and therefore could not perform any changes.

### **6.3 Factors that caused Changes**

The factors for changes after the education turned out to be hard to identify exactly. Many of the factors investigated in the survey appeared to have little to none effect on the changes, as shown by the mean values and size of the effects in the result. Instead, there are probably other factors, internal or external, which affects the outcome of the education. One factor, consciously excluded, is the education and its setup and educators. Another factor mentioned from the respondents was the attitude of managers. The effect of the attitude of management was anticipated to be possible to compiled from the answers from the management, but due to low response rate it was hard to find any clear patterns.

The factors common for the whole organisation did not show any clear effects of changes made as shown in section 5.3. None of the organisational factors showed a significant difference between the answers. The fact that environmental certification lead to a lower amount of changes should be a result of the changes already made by the certified organisations. The changes done after an education event, especially if others from the organisation already attended, would then lead to fewer changes as there are fewer or none left to be made. Of the other organisational factors only size showed some result, with the medium sized organisations of the study as the ones with fewest changes. The reason could be that SMEs often have problems implementing changes due to their size (Gadenne et al., 2009). The managers of the very smallest have easier implement changes as they only affect themselves and the big organisations have more resources and means for change and to encourage supplier or costumers.

#### **6.3.1 Individual Factors**

Of the personal orientated factors the position in the organisation had the biggest impact on the outcome of the education, with  $\eta^2=0.72$  being the highest effects size and a significant result, as shown in section 5.3. The highest amount of changes made was from the ones in management. It is not surprising, as the management often have more means to influence the business. As mentioned earlier, it is also likely that the ones that have participated in the survey have a higher environmental

interest than regular, which explains the higher mean value of changes made from the one in management. They also have better insight in the work and will know about all changes made. That males have a higher mean value of summation of effects could be since a higher part of participating men is in management than women. The same could be an explanation to that longer time at the work place correlates to higher amounts of effects. Employees with a longer time in an organisation are also aware of previous changes, due to earlier participations at environmental educations.

The effects due to different age-groups are interesting as it best described quadratic, see Table 5.6 in section 5.3. That the youngest have stated lesser amount of effects can be explained by their presumed limited involvement in the decision making and limited insight in the organisations environmental practices. Further, they have not had the time to influence the organisation in the same extent as more senior co-workers. Older employees lower mean value of effects after the education indicated that older are less prone to implement environmental practices at their work places or at least less prone to get insight in the environmental practices.

That higher education results in a chance of lower amount of changes, as shown in table 5.8, could seem strange but are in fact not surprising. Studies shows that even though higher education leads to higher environmental awareness, it does not correspond to high amount of environmental actions in the own behaviour (Olli, Grendstad, and Wollebaek, 2001). The exact reason for this is not obvious and it is hard to imagine why higher awareness does not lead to higher amount of actions.

### 6.3.2 Factors regarding attitude

Of factors concerning the participants' environmental attitudes the largest influence seems to come from if the participants think that they can make a difference, with an effect size of 0.055 as presented in section 5.3. This result was anticipated as it is not likely that people will put effort in changes if they do not anticipate that it will make a difference. Although, most of the participants thought they could make a difference which make the result less certain. It was disappointing that the attitude towards changes gave such poor correspond to the amount of changes, as presented in section 5.3. This could be due to social bias, that the respondents think that it is expected of them to like changes, or that they have poor insight in their own feelings and reactions regarding changes. It could also be the cause of the participants' insecurities towards change and that there has been a lack of communication in the organisations environmental work and the benefits of it (Richardson and Denton, 1996).

The participants' feelings before the education showed some effect, with  $\eta^2=0.041$ , see section 5.3. The result is reasonable as it is more likely to appreciate and remember and supporter following changes if the feelings throughout the education were positive. The other questions regarding feelings and expectations did not give any useful output, as it was more or less the same answers from all participants. One reason could be that it is hard to remember one's feelings a long time after the education, especially if the feelings differed before and after.

## 6.4 Conclusion

The effect of the education varied greatly between workplaces. Some have done tremendous changes over the years while others have done less changes. Overall, the thing most respondents believe changes after the education is the mindset and environment awareness at the work place, whereas all are more aware of sustainability and can participate in discussions. Furthermore, most organisation chose a built-on approach of changes, instead of more profound changes. This is not surprising as it is easier to implement smaller changes as it does not require the same amount of effort.

Of the different factors investigated, none correlate substantially with the effects of the environmental education. However, among the factors some are worth mentioning; the position in the organisations and their feelings before the educations has shown to have biggest effect. Besides the investigated factors the setup of the education and the environmental awareness of the management was mentioned in the survey as big influences on the changes made.

One of the main purposes with the project was to help Ekocentrum evaluate their basic environmental education. This purpose was fulfilled and Ekocentrum got material for the development of their educations. Beside the contribution to the work of Ekocentrum and their development, the study has been an evaluation of an area that are unexplored. Thereof, it will contribute to future projects of similar frameworks. Furthermore, the aims with the study was to evaluate the effects of the basic environmental education. As some effects and, even more important, some types of effects have been determined this aim is fulfilled and could be able to be used of other organisations offering environmental educations, besides Ekocentrum.

As it is a complex area of research, both evaluation of education and the effects of education, it is hard to know if the approach used in this study is optimal. However, even a study as this one, that have tested only one approaches for evaluation, could be useful in future studies in similar subjects. Thereby, the study has pioneered for other projects in the future.





# 7

## Future studies

This project was a pilot study and thereby the result or conclusions cannot be considered fully evidenced. Here follow some proposals for future studies.

- To get a more statistic correct result a bigger study should be completed. However, even with a bigger study would likely have problem with response rate which would lead to the same difficulties with unclear results.
- The selection of participants could be done with focus on more specific aspects. A reasonable focus group for a future study could be only managers or environmental coordinators, with each response representing the whole organisation. This approach would not have the uncertainty of different answers from the same organisation, but could miss important changes due to the human error.
- Another way to select participants differently could be by choosing one organisation and only investigate the attitude, factors and changes in that one organisation. This would give a clearer picture of how the position in combination with attitude influence the effects of the education. Furthermore, it would display the awareness of organisations environmental work, as this study have shown that many employees do not know which changes that are made.
- One reason for the difficulty to fins patterns from the result could be the time since the respondents participated in the education. If the environmental attitude would be investigated or feelings towards the education it would be interesting to do a study over a longer range of time. Then it would be possible to make the participants complete three surveys, one before, one directly after and one a longer time after the education. The feelings, attitude and awareness could then be connected to the changes made.



# Bibliography

- Avfall Sverige. (2016). *Hushållsavfall i siffror -kommun- och lönsstatistik 2015*. Malmö: Avfall Sverige.
- Bateson, G. (1972). The logical categories of learning and communication. *Steps to an Ecology of Mind*, 279–308.
- Brace, I. (2013). *Questionnaire design: how to plan, structure and write survey material for effective market research, 3rd edition (3rd ed.)* Philadelphia, Pa; London;: Kogan Page.
- Cohen, J. (1988). Statistical power analysis for the behavioral sciences new jersey-lawrence erlbaum associates. *Inc. Publishers*.
- Dilley, P. (2000). Conducting successful interviews: tips for intrepid research. *Theory into Practice*, 39(3), 131–137.
- Dwyer, D. K. (1996). Questioning between heartbeats: the interviewing techniques of journalists. *Performance Improvement*, 35(7), 16–19. doi:10.1002/pfi.4170350706
- Ekocentrum. (n.d.-a). Om oss. Retrieved February 17, 2017, from <https://www.ekocentrum.se/om-oss/>
- Ekocentrum. (n.d.-b). Välkommen till mötesplatsen för hållbar utveckling. Retrieved February 17, 2017, from <https://www.ekocentrum.se>
- Gadenne, D. L., Kennedy, J., & McKeiver, C. (2009). An empirical study of environmental awareness and practices in smes. *Journal of Business Ethics*, 84(1), 45–63.
- Groves, R. M., Presser, S., & Dipko, S. (2004). The role of topic interest in survey participation decisions. *Public Opinion Quarterly*, 68(1), 2–31.
- Idé & ResursCentrum. (n.d.). Grundläggande miljöutbildning. Retrieved March 21, 2017, from <http://www.idecentrum.se/index.cfm?id=277&l=2>
- Kotter, J. P. (2012). *Leading change*. Boston, Massachusetts: Harvard Business Review Press.
- Macpherson, A. & Wilson, A. (2003). Enhancing smes' capability: opportunities in supply chain relationships? *Journal of Small Business and Enterprise Development*, 10(2), 167–179.
- Miljögiraffen. (n.d.). Utbildning miljödiplomering. Retrieved March 17, 2017, from <http://www.miljogiraff.se/utbildning-miljodiplomering>
- Montgomery, D. C. (2008). *Design and analysis of experiments*. John Wiley & Sons.
- National Research Council. (1999). *Our common journey: a transition toward sustainability*. Washington, D.C.: National Academies Press.
- Naturvårdsverket. (2000). *Miljöledningssystem*. Stockholm: Naturvårdsverket.

- Olli, E., Grendstad, G., & Wollebaek, D. (2001). Correlates of environmental behaviours: bringing back social context. *Environment and Behavior*, *33*(3), 181–208.
- Phillips, D. C. & Soltis, J. F. (2014). *Perspektiv på lärande*. Lund: Studentlitteratur.
- Richardson, P. & Denton, D. K. (1996). Communicating change. *Group and Organization Management*, *35*(2), 69–83.
- RSM&CO. (n.d.). Miljöutbildning för miljödiplomerade verksamheter. Retrieved March 17, 2017, from <http://www.rsmco.se/utbildning/kurser/miljoutbildning-for-miljodiplomerade-verksamheter/>
- Rutherford, A. (2001). *Introducing anova and ancova: a glm approach*. Sage.
- Smeltzer, L. R. (1991). An analysis of strategies for announcing organization-wide change. *Group and Organization Management*, *16*(1), 5–24.
- Sterling, S. (2004). Higher education, sustainability, and the role of systemic learning. In P. B. Corcoran & A. E. Wals (Eds.), *Higher education and the challenge of sustainability* (pp. 49–70). Kluwer Academic Publishers.
- Upphandlingsmyndigheten. (n.d.). Miljöledningssystem. Retrieved February 17, 2017, from <http://www.upphandlingsmyndigheten.se/hallbarhet/stall-hallbarhetskrav/hallbarhetskrav-i-upphandlingsprocessen/miljoledningssystem/>
- World Commission on Environment and Development. (1987). *Our common future*. Oxford: Oxford University Press.

# A

## The Survey

This appendix includes the full survey sent out to participants of Ekocentrum's environmental education as well as all the e-mails sent out. It is written in Swedish as it was sent out in Swedish and to minimize misinterpretations based on language barriers.

Below are the questions in order that they were included in the survey that was distributed to organizations participating the education. The questions marked with \* had to be answered before moving on to the next page of questions.

Explanation of questions: Question (*Level of measurement*)

After the layout of the survey follows the mail-texts used to distribution of the survey.

### A.1 Survey layout

- **Page 1:**

Denna enkät syftar till att utvärdera Ekocentrums grundläggande miljöutbildning. Utbildningen är ungefär en halvdag lång och äger rum antingen i Ekocentrums lokaler eller på arbetsplatsen.

Du har fått enkäten då din verksamhet har deltagit i utbildningen under 2015 eller 2016. Enkäten kommer innehålla frågor dels om vad som har förändrat i verksamheten sedan genomförd utbildning samt frågor om inställning och motivation till utbildningen och hållbar utveckling.

- **Page 2:** Answered by everyone

- Med vilken arbetsplats gick du på Ekocentrums miljöutbildning? \* (*Lista*)
- Hur många är ni i verksamheten du arbetar? \* (*Intervall*)
- Vad är din position i verksamheten? \* (*Ledning/Miljösamordnare/Annan(Specifera)*)
- Har du deltagit i Ekocentrums grundläggande miljöutbildning? \* (*Ja/Nej*)

- **Page 3:** Answered by everyone (*answers are given by free text*)

Dessa frågor handlar om vilka förändringar som skett i er verksamhet efter att

ni har deltagit i Ekocentrums miljöutbildning.

Om andra i verksamheten har gått utbildningen tidigare kan förändringarna som skett sedan arbetsplatsen första besök hos Ekocentrum räknas med.

- Vad kommer du ihåg bäst från utbildning?
- Vilka är de viktigaste förändringarna som skett på din arbetsplats som följd av miljöutbildningen?

- **Page 4:** Answered by everyone (*Ja/Nej/Gjorde redan/Vet ej*)

Dessa frågor handlar om vilka förändringar som skett i er verksamhet efter att ni har deltagit i Ekocentrums miljöutbildning.

Om andra i verksamheten har gått utbildningen tidigare kan förändringarna som skett sedan arbetsplatsen första besök hos Ekocentrum räknas med.

- Efter utbildningen på Ekocentrum har min verksamhet börjat... \*
  - \* Ändra typ av material som används (ex. städmaterial eller kaffe)
  - \* Planera inköp för att minska mängden avfall
  - \* Minska mängden förbrukningsvaror som används (ex. rengöringsmedel eller utskrifter)
  - \* Källsortera
  - \* Använda el och värme från förnybara energikällor
  - \* Handla aktivt för att minska vattenförbrukningen
  - \* Ha (del i) bikupa
  - \* En egen fortutbildning i hållbar utveckling för verksamheten
  - \* Arbeta med kretslopp eller en medvetenhet om ett större sammanhang (ex. vagga till vagga eller cirkulär ekonomi)
  - \* Andra miljöaktiviteter (ex. miljöcafé eller egen odling)

- **Page 5:** Answered by everyone (*Alternatives*)

Dessa frågor handlar om vilka förändringar som skett i er verksamhet efter att ni har deltagit i Ekocentrums miljöutbildning.

Om andra i verksamheten har gått utbildningen tidigare kan förändringarna som skett sedan arbetsplatsen första besök hos Ekocentrum räknas med.

- Vilka typer av transport använder ni inom verksamheten innan och/eller efter utbildningen? \*
  - \* Bil
  - \* Långa resor med bil
  - \* Flyg
  - \* Tåg
  - \* Taxi

- \* Kollektivtrafik
- \* Cykel/gång
- \* Inga
- \* Annat

- **Page 6:** Answered depending on answer on Page 5

Frågorna nedan handlar om hur era transporter har förändrats sedan ni gick utbildningen

- Har ni ändrat till ett mer miljövänligt drivmedel vid transport?  
*Som till exempel biogas eller elbilar istället för bensin  
(Ja/Nej/Slutat använda bil/Användes redan/Vet inte)*
- Har ni ändrat val till mer miljövänliga alternativ vid långa resor?  
*(Ja/Nej/Gjorde redan/Vet inte)*
- Har ni ändrat tankesätt vid korta resor?  
*Som till exempel samåkning, kollektivt eller cykel  
(Ja/Nej/Gjorde redan/Vet inte)*
- Motivera gärna dina svar här (*Answers are given by free text*)

- **Page 7:** Answered by everyone (*Answers are given by free text*)

Dessa frågor handlar om personliga förändringar efter genomförd utbildning.

- Hur har din personliga inställning till hållbar utveckling förändrats?

- **Page 8:** Answered by everyone

Dessa frågor handlar om personliga förändringar efter genomförd utbildning.

- Ökade utbildningen din känsla för att dina val kan göra skillnad för miljön? (*Ja/Nej*)
- Har du förändrat några vanor utanför arbetet för att verka för en hållbar utveckling?  
*Exempel sopsortering, klädinköp, val av energikällor eller transport  
(Ja/Nej/Gjorde redan allt innan utbildningen)*

- **Page 9:** Answered by everyone (*answers are given by free text*)

Nu kommer frågor om vad ni tyckte om utbildningen.

- Vad tyckte du om Ekocentrums miljöutbildning?
- Vad tror du är anledningen till att det skett förändringar eller inte efter miljöutbildningen?

- **Page 10:** Answered only by corporate leadership (*Answers given in free text*)
  - Vad skulle varit annorlunda med utbildningen för att fler förändringar skulle skett?
  
- **Page 11:** Answered only by environmental manager
  - Hur lång tid är det sedan verksamheten först gick utbildningen? (*Scale*)
  - Har du märkt en attitydförändring i verksamheten efter utbildningen? (*Free text*)
  - Vad skulle behöva vara annorlunda med utbildningen för att fler förändringar skulle ske? (*Free text*)
  - Vad skulle behöva vara annorlunda inom er verksamhet för att fler förändringar skulle ske? (*Free text*)
  
- **Page 12:** Answered by environmental manager and corporate leadership
  - Vilken utveckling skulle ni vilja se av miljöutbildningar? (*Alternatives*)
  
- **Page 13:** Answered by everyone (*Scale*)

Nedan följer frågor om era inställningar till förändringar och motivation inför utbildningen.

  - Vad anser du om generella förändringar inom verksamheten?  
*Som till exempel omorganiseringar, nya rutiner eller nya lokaler*
  - Vad känner du för förändringar för att göra verksamheten mer miljöanpassad?
  
- **Page 14:** Answered by everyone (*Ja/Nej*)

Nedan följer frågor om era inställningar till förändringar och motivation inför utbildningen.

  - Finns det miljöproblem i världen idag?
  - Känner du dig delaktig i din arbetsplats arbete inom miljö och hållbar utveckling?
  
- **Page 15:** Answered by everyone  
Nedan följer frågor om era inställningar till förändringar och motivation inför utbildningen.
  - Var du tvungen att gå utbildningen? (*Ja, annars hade jag inte gått den/Ja, men jag hade gått den ändå/Nej*)
  - Hur kände du inför miljöutbildningen på Ekocentrum? (*Scale*)



- Uppfylldes dina förväntningar (*Ja/Nej*)
- Hur kände du efter genomförd utbildning? (*Scale*)
  
- **Page 16:** Answered by everyone
  - Är verksamheten miljödiplomerad?  
*Eller motsvarande som ISO 14001 eller EMAS.*  
(*Ja/Nej/Vet inte*)
  - Finns det miljösamordnare i verksamheten?  
*På hel- eller deltid*  
(*Ja/Nej/Vet inte*)
  - När gick du utbildningen? (*Intervall*)
  - Har andra från din verksamhet varit på motsvarande utbildning tidigare?  
(*Ja/Nej/Vet inte*)
  - Hur länge har du arbetat på din nuvarande arbetsplats? (*Intervall*)
  
- **Page 17:** Answered by everyone
  - Ålder (*Intervall*)
  - Kön (*Alternativ*)
  - Vilken är din högsta avslutade utbildning? (*Alternativ*)

## A.2 E-mails

The following e-mails were sent to all clients, of the last two years, of Ekocentrum.

### A.2.1 Introduction e-mail

This is the introduction mail that was sent:

Ämne: (Svara senast 24 mars) Enkät: Utvärdering av Ekocentrums utbildning

Hej!

Som en del av Ekocentrums utvecklingsarbete genomförs just nu ett examensarbete med syfte att utvärdera effekterna av grundutbildningen i hållbar utveckling. Syftet är förutom att undersöka effekterna också att se hur utbildningen bör anpassas för att svara på verksamhetens behov.

Du har fått detta mail eftersom du bokade tillfällen för grundläggande miljöutbildning till *företagets namn* under 2015 eller 2016. Vi skulle uppskatta om du kunde ta dig tid att svara på enkäten och vidarebefordra den till de som deltog i utbildningen från din verksamhet dessa åren samt ledning och miljösamordnare.

Enkäten tar cirka 10 minuter att svara på och är anonym. Självklart får du ta del av det slutliga resultatet om så önskas, svara i så fall på detta mail. Denna länk tar dig till enkäten: [LÄNK](#)

Tack på förhand!  
Många hälsningar,  
Lisa Strand och Rickey Katz, Exjobbare från Chalmers för Ekocentrum  
[lisastr@student.chalmers.se](mailto:lisastr@student.chalmers.se) [rickey@student.chalmers.se](mailto:rickey@student.chalmers.se)

### A.2.2 First reminder e-mail

This mail was sent as a reminder 1 week before the deadline.

Ämne: (Svara senast 24 mars) Påminnelse om enkät: Utvärdering av Ekocentrums utbildning

Hej!

Vidarebefordra gärna denna påminnelse till övriga på din arbetsplats! Om du redan svarat på enkäten "Utvärdering av Ekocentrums grundläggande miljöutbildning" och vidarebefordrat den till andra i verksamheten ber vi dig att bortse från detta mail och tackar dig än en gång för ditt deltagande.

Detta mail är en påminnelse om att delta i en utvärdering av Ekocentrums miljöutbildning som görs som ett examensarbete. Svaren från dig och övriga på din arbetsplats är viktiga för att utvecklingen av Ekocentrums utbildning och vårat

examensarbete.

Svara senast nu på fredag på följande länk: LÄNK

Många hälsningar

Lisa Strand och Rickey Katz, Exjobbare från Chalmers för Ekocentrum  
lisastr@student.chalmers.se rickey@student.chalmers.se

### A.2.3 Second reminder e-mail

This reminder was sent on the morning of the deadline.

Ämne: (OBS: Svar idag) Påminnelse om enkät: Utvärdering av Ekocentrums utbildning

Hej!

Detta är en påminnelse för att hjälpa oss med vårt examensarbete genom att delta i en utvärdering av Ekocentrums grundutbildning. För att kunna genomföra detta behövs så många svar från varje verksamhet som möjligt. Utöver att själv svara på enkäten skulle vi därför uppskatta om den skickades ut till alla i verksamheten som deltagit i utbildningen.

Om du redan svarat på och vidarebefordrat enkäten tackar vi dig än en gång för ditt deltagande och ber dig bortse från detta mail.

Idag är sista dagen att svara och det görs på följande länk: LÄNK

Många hälsningar

Lisa Strand och Rickey Katz, Exjobbare från Chalmers för Ekocentrum  
lisastr@student.chalmers.se rickey@student.chalmers.se

### A.2.4 Final e-mail

Because of the low response on the survey, the deadline was pushed forward another week and this last e-mail was sent.

Hej!

På grund av lågt deltagarantal har vi förlängt tiden att svara på enkäten till på fredag, den 31 mars. Detta är en påminnelse för att hjälpa oss med vårt examensarbete genom att delta i en utvärdering av Ekocentrums grundutbildning. För att kunna genomföra detta behövs så många svar från varje verksamhet som möjligt. Utöver att själv svara på enkäten skulle vi därför uppskatta om den skickades ut till alla i verksamheten som deltagit i utbildningen.

Om du redan svarat på och vidarebefordrat enkäten tackar vi dig än en gång för ditt deltagande och ber dig bortse från detta mail.

## A. The Survey

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Nu på fredag är alltså sista dagen att svara och det görs på följande länk: [LÄNK](#)

Många hälsningar

Lisa Strand och Rickey Katz, Exjobbare från Chalmers för Ekocentrum  
lisastr@student.chalmers.se rickey@student.chalmers.se

# B

## The Interviews

The interviews were performed in Swedish and below the questions are showcased.

- Kan du kortfattat beskriva vad ni gör här på arbetsplatsen?
- Vad är din roll på arbetsplatsen?
- Vad var anledningen att verksamheten deltog i utbildningen? Finns det flera? (Varför valde ni att miljödiplomera er?)
- Hur länge sedan var det verksamheten gick Ekocentrums miljöutbildning för första gången? (om oklart)
- Ev. Något speciellt oklart från enkäten?
- Hur var miljötänket på arbetsplatsen innan utbildningen? Gjordes mycket/något?
- Hur var den allmänna inställningen till att gå utbildningen?
  - Var det många/få som var intresserade/drivande i att gå? Från vilka grupper var drivande?
  - Hur såg inställningen ut i olika grupper på arbetsplatsen? (Ex. ledning mm, specifika exempel beroende på arbetsplats?)
- Anser du att de förändringar som skett efter utbildningen har bidragit till att verksamheten gör skillnad för miljön? Varför/Hur?
- Vad har förändrats på arbetsplatsen eller i ert arbetssätt sedan ni gick miljöutbildningen hos Ekocentrum?
- Vilka rutiner har ändrats efter utbildningen?
- Vad tror du bidrog till/hindrade förändringar efter utbildningen?
- Finns det något som du känner att verksamheten skulle veta mer om när det kommer till miljön och hållbar utveckling?
- Känner du att det finns vissa positioner i verksamheten som skulle behöva en mer fördjupande utbildning? Om ja, vilket och om vad?



# C

## Contribution report

Following, the division of the work is presented.

Lisa was responsible for the survey and the following analysis. Rickey was responsible for the analysis of the interviews. This division has been constant throughout the whole project, with Lisa focusing on the surveys and Rickey on the interviews. The planing of the project was done mutually.

This report was written by both. The introduction was mutually written. In the theory, Lisa wrote about levels of learning and SMEs while Rickey wrote about organisational changes. The method was divided based on area of responsibility (survey vs. interviews). Lisa wrote the main part of the result, and discussion while Rickey made some inputs in the sections from the interviews. The conclusion and future studies were written by Lisa.

Rickey had a some what bigger responsibility with the L<sup>A</sup>T<sub>E</sub>X-file.