Norwegian University
of Life Sciences

Incentives, barriers and measures for increased recycling among students in student dorms: A behavioral case study on students living in selective SiÅs housings

Nuzat Naima Islam
Renewable Energy
Faculty of environmental sciences and natural resource management

Foreword

This master's thesis is conducted as a compulsory part and a final topic in the master's degree program in renewable energy at the Norwegian University of Life Sciences (NMBU), Ås. The thesis has been written under supervision of my supervisor Ole Jørgen Hanssen from NMBU.

I would like to direct my special thanks and gratitude to my supervisor, who with his professional competence and dedication have contributed in the work of the thesis. His feedback and support has made the work meaningful and very educational. I would also like to thank Pål Magnus Løken from SiÅs for being forthcoming with information and helpful with solutions.

Thank you to all who have provided information and input in the work of the thesis. I would also like to thank those who took the time to respond to the survey.

At last, I would like to thank my wonderful sister Nushrat Naima Islam for proofreading the thesis, offering insightful feedback and constant support through the whole period of the thesis work.

Norwegian University of Life Sciences

Ås, 14 December 2017

_____

Nuzat Naima Islam

Sammendrag

Avfallssortering og gjenvinning har blitt et viktig mål i miljøpolitikken. Som følge av dette har avfallshåndteringspraksisen endret seg radikalt i mange land rundt omkring i verden. Et av de store problemene ved avfallshåndtering er den utilstrekkelige sorteringspraksisen. Ved å øke bevisstheten om problemet og om miljøpåvirkningen er det potensiale til å innføre bedre vaner og oppnå høyere materialgjenvinning.

Denne masteroppgaven er utarbeidet med veiledning fra min veileder i NMBU, med sikte på å øke kunnskapen om gjenvinningsadferden, holdningen og barrierer som påvirker sorteringen av husholdningsavfall blant studenter i SiÅs. Den oppnådde kunnskapen er ment til å være til hjelp for å iverksette fremtidige tiltak for å forbedre sorteringssystemet og forholdene i studentboligene.

Forskningsspørsmålene besvares ved å bruke dataene hentet fra selvkomponert undersøkelse som er distribuert til studenthyblene ved Pentagon 1, Pentagon 2, Palisaden og Ponoma under uke 40-41. Analysen av resultatene av denne studien er basert på forskningsspørsmålene. Metode kapittelet beskriver objekter av studie og valg av data- og forsknings design. Et kvantitativ forskningsdesign er brukt for å generalisere resultatene for resten av studentbefolkningen. Resultatene av dataene analyseres ved hjelp av IBM SPSS analyseverktøy. Følgende statistiske tester utføres i evalueringen av resultatene: deskriptiv analyse, krysstabeller med Kji-kvadrat test og Fisher's eksakt test.

Analysen av dataene indikerer at kjønn, boligtype, opprinnelsessted, familiebakgrunn er alle beskrivende for positive eller negative kildesorteringsvaner og holdninger. Studenter som har balansert miljø og god praksis for avfalls sortering hjemmefra, utvikler dårlige vaner når de møtes med et verre system enn det de er vant til. De to viktigeste barrierene som er kartlagt blant studentene er i) mangel på tid, vilje og involvering av andre, og ii) tilgang eller tilgjengelighet av god sorteringssystem for avfall. Det er stor etterspørsel for mer informasjon og kunnskap om sorteringssystemet som er tilgjengelig for studentene. Innføring av mer informasjon om gjenvinning av avfall og sorteringssystemet sammen med ukentlig kontroll av avfallssorteringen regnes som en motiverende faktor. Tilbud av et bedre system og mulighet til å sortere plast er det mest etterspurte tiltaket blant respondentene.

Abstract

Waste sorting and recycling has become an important goal in environmental policy. As result waste management practices has changed radically in many countries around the world. One of the major problems in the management of the waste is the inadequate sorting practices. Increasing awareness of the problem and the environmental impact has the potential to adopt better habits and influence higher degree of material recovery.

This master thesis has been prepared with supervision from my supervisor in NMBU, with the aim to increase the knowledge about recycling behavior, attitude and barriers that influence the sorting of household waste among the students of SiÅs. The knowledge attained is intended to be helpful towards initiating future measures to improve the sorting system and the conditions in the dorms.

The research questions are answered by using the data obtained from self-composed survey that has been distributed to student housings Pentagon 1, Pentagon 2, Palisadden and Ponoma in week 40-41. The analysis of the results of this study are based on the research questions. The method chapter describes the objects of study and choice of data and research design. A quantitative research design is applied to generalize the results for the rest of the student population. The results of the data are analyzed by using the IBM SPSS analysis tool. The following statistical tests are conducted in the evaluation of the results: descriptive analysis, cross tabs with chi-square test and fisher's exact test.

The analysis of the data indicate that gender, housing type, place of origin, family background are all descriptive of positive or negative recycling habits and attitudes. Furthermore, students who have balanced environment and good practices towards waste recycling from home, develops deteriorating habits when met with worse system than the one they are used to. The two most important barriers that are mapped among the students are i) lack of time, will and involvements of others and ii) access or availability of good sorting system for waste. There is high demand for more information and knowledge regarding the sorting system available to the students. The provision of more information regarding waste recycling and the sorting system along with the weekly checkup is considered a motivating factor. Better system and opportunity to sort plastic is the most demanded measure among the respondents.

Table of Contents

List of figures

List of tables

1. Introduction

1.1 Purpose of the research

The economic growth along with the growth in population is contributing to an increased consumption and the generation of more waste. This scenario is especially dominated in the Norwegian society (Miljødirektoratet, 2014). Despite many attempts at waste reduction and progress towards a sustainable development, we are still burning more of the waste instead of investing in reuse. Every action we take, every resource we use, has an impact on the environment and affects everyone in all stages. As a result, this has caused a substantial pressure on the environment. There is an increased demand for resources. Therefore the pressure of maintaining a steady supply of vital resources that are needed for production and also creating an effective system to break down the incessantly amplified generation of waste is growing. In order to combat these challenges, it is essential to raise awareness of the deteriorating quality and of the environment and ensure higher acknowledgement that there is valuable recoverable resources in the waste we dispose. Household waste management has emerged as a key focus area of improvement. To make such changes beneficial, it is also important to map people's responses to waste generation and waste sorting solutions.

As the production of waste is increasing steadily and rapidly across the globe, dealing with the disposal of such vast amounts in the demanded frequency is becoming a huge problem. A problem not just environmentally but also logistically and financially. On the other hand, to take care and utilize the resources in the waste is becoming a major industry (Malmo, 2013). The consequences of population growth and economic growth is, leading to a rapidly increasing ecological footprint which makes steps towards sustainability and a circular economy more crucial than ever. In 2014, the EU launched its new action plan for circular economy and increased resource efficiency (European Commission, 2014). The action plan sets stricter objectives for increased material recycling and resource efficiency for waste systems across Europe, setting a target of 70%

recycling of household waste. On the road to contributing to these goals, Ås municipality has implemented a new sorting system from October 2017. The inhabitants in the municipality are given the opportunity to sort food waste from the residual waste. This has also been implemented in the student dorms of SiÅs throughout the fall semester 2017. Achieving a successful implementation of this new system depends on the consumers and their actions. The environmental attitudes and behaviors of the students need to be investigated in order to understand how to maximize the success of the recycling and waste minimization schemes.

This master thesis will focus on studying background variables, motivating factors and barriers to waste source sorting behavior among the students of SiÅs studying at NMBU. It will also observe and compare how the students adjust to the new system. Newly admitted students and students who have been studying at NMBU for a longer period were compared through data analysis of data obtained from a personalized survey. The survey consisted of questions on their attitude, behavior and practices in relation to household waste and waste sorting. The main purpose of the paper will be to increase insight within waste sorting practices among students and importance of background habits/experiences. The study aims to inform future steps of decision-making instruments and measures that can contribute to a higher material recovery for household waste among students.

1.2 Background on waste production and waste policies

The Waste Framework Directive (WFD) defines waste as "*any substance or object which the holder discards or intends or is required to discard*" (European Union, 2008) The definition of waste determines what falls under the Directive's scope. In addition to this the concept also affects the EU's approach towards waste management. This definition of waste stated in the WFD is crucial for legal purposes as well, as legal documents in various fields of environmental legislation refer to it (Falkenberg, 2012). The WFD further defines waste management as, "the collection, transport, recovery and disposal of waste, including the supervision of such operations and the after-care of disposal sites, and including actions taken as a dealer or broker" (European Union, 2008).

There are differences in definitions of waste and waste management nationally in the countries of EU. Additionally, different methodologies for processing the data obtained leads to some uncertainties in analyzing the European waste trends. As a result of increased improvement in the

management of municipal waste in the EU-27, Switzerland and Norway, the EEA estimated that the annual net greenhouse gas emissions was cut by 57 million tons CO2-equivalent in the period 1990-2012, especially from 2000 (EEA, 2012). The progress towards waste targets are mixed. But the EU estimated that by implementing the EU waste legislation could save EUR 72 billion a year by the year 2020, along with create 400 000 jobs. Further, it was estimated a turnover of EUR 42 billion by increasing annual EU waste management and recycling sector (European Union, 2013). Consumption is identified as an essential factor to be concerned about when considering long term environmental and development strategies.

1.2.1 Waste Policies

Today the waste resource perspective has become more important in waste policy, both in an international perspective and in Norway. This promotes the perspective of an circular economy. The Ellen MacArthur foundation defines circular economy as "an industrial system that is restorative or regenerative by intention and design." They further explain that it replaces the 'end-of-life' concept with restoration while steering in the direction of the use of renewable energy. Circular economy excludes the use of toxic chemicals and aims for the elimination of waste through the superior design of materials, products, systems and also promotes superior business models (MacArthur, 2013).The European Commission published a communication in July 2014, to back up the adoption of circular economy principles that was set to achieve EU2020 objectives of sustainable growth. This publication promotes a move from linear production and consumption models founded on waste to more cyclic models, which will contribute to the reduction or elimination of waste. The circular economy model implementation would lead to advancement in the growth of EU, along with increasing GDP and creating new employment prospects (EUKN, 2014). It also discusses the possibility to open up new markets and reduce the dependence on importing raw materials in order to lower the impacts on the environment.

The European waste policy is implemented in Norway through the EEA Agreement (Ministry of the Environment 2013). This is a trade agreement between the EEA countries including Norway and the EU. By committing to this agreement EEA countries gain access to the EU's internal trading markets and are consequently bound to EU legislation. Both locally and regionally, the waste policy in Norway is set by EU guidelines from international conventions and directives (Fredriksen 2016). Norwegian waste policy has since 1990, taken basis on an overall objective to

ensure that waste is taken care of in order to minimize their damage or the disadvantages. The waste policy in Norway promotes reuse, material recycling and energy utilization of the waste that occurs (Miljøverndepartementet, 2013).

Most preferable

Avoid and reduce waste

Reuse waste

Recycle waste

Recover energy

Treat waste

Dispose of waste
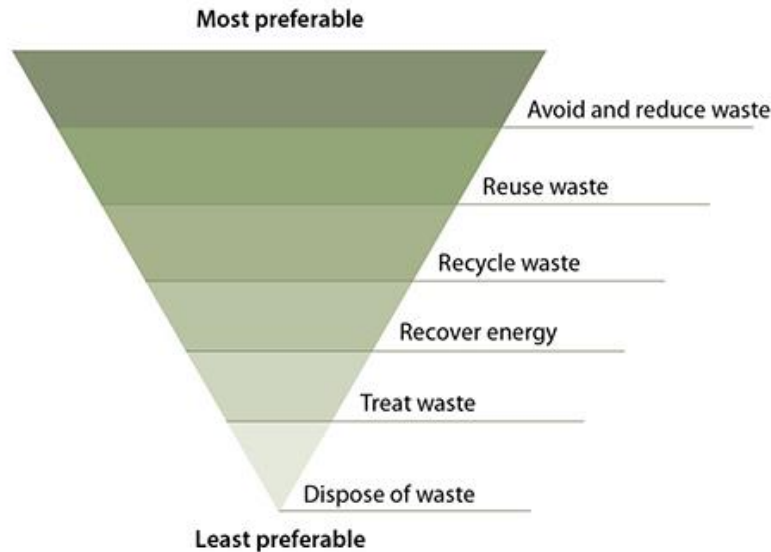
Least preferable

Figure 1: The waste hierarchy with the different leves ranging from most prefarable to least preferable method of managing the waste . (NSW EPA,2017)

The Norwegian government is responsible to facilitate the comprehensive and local waste policy in Norway, which is done in line with EU policies. The foremost goal is to uphold the national target of waste in Norway that states that waste should do as little harm to people and nature as possible (Miljøverndepartementet, 2013). The waste hierarchy (Figure 1) sets standardized guidelines as to how Norwegian policies prioritize waste management while developing new policies. Waste prevention is the most emphasized and desired goal followed by reuse and material recovery. At the bottom of preferred treatment of the waste is energy recovery and disposal or other releases. Norway aims to let least amount of waste go to disposal as it results in it going out of the system and therefore cannot contribute to the loop of the circular economy. This is to be accomplished in line with the economic growth whilst ensuring that the growth in waste volumes is lower than that of the economy (Miljøverndepartementet, 2013).

1.3 The progress towards circular economy in Norway

Each individual is producing more waste. Latest data from Statistics Norway (SSB) show that the quantity of waste have never been higher than in 2014. Since 1995, the total volume of waste has grown by 60%. The statistics show that in total 11,9 million tons of waste occurred in 2014 (Miljødirektoratet, 2017). Aftenposten reports that the rate of recycling fell in Norway by 2,2% from 2001 to 2010. Comparisons show that Norway had a recycling rate of 41,1% for municipal waste in 2013 compared to 44,3% from 2001 (Bleikelia, 2013). Not only did the recycling rate decrease, but the amount of waste produced increased with 100 kilos. Norwegians produce almost 500 kilos of waste every year now. Advisor in SSB Eva Vinju states that this change is related with prices and the market and what is profitable among other factors (Bleikelia, 2013).

Figure 2: Steps in linear economy (Source: EC, 2014).

Recently, the government presented a strategy for green competitiveness that will equip Norway to seize the new opportunities that the green shift will bring. According to Avfall Norge, the strategy addresses seven principles of green competitiveness that will form the basis for future policies (Avfall Norge, 2017). Change in the framework conditions for Norwegian business capital is brought by the growing stricter global climate policies and the ever faster developments in the technology world.
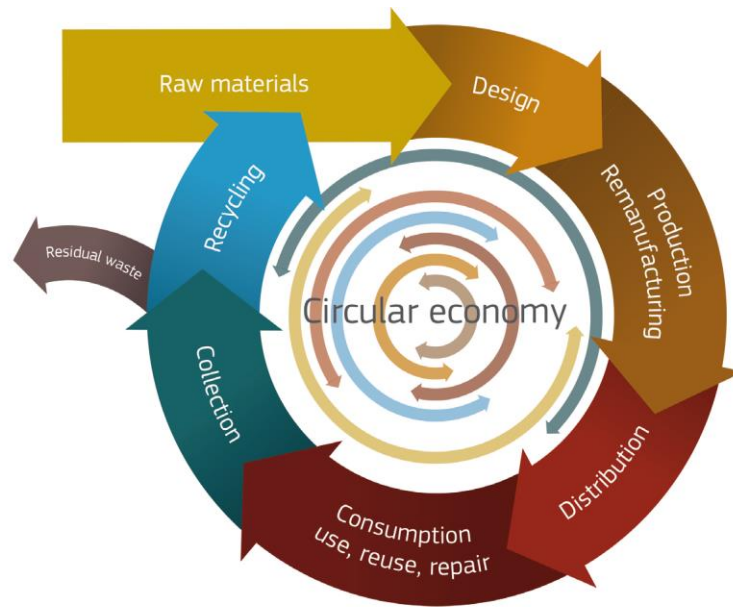
Figure 3: The focus and key points in a circular economy (EC, 2014)

The strategy that is proposed sets out seven principles and presents policies to strengthen green competitiveness and convert Norway into a low-emission society. According to Vidar Helgesen, the Norwegian Climate and Environment minister, the green shift provides opportunities for growth in new industries and does not hamper growth in economy. It points out the way towards a zero-emission society, not a zero-growth society (regjeringen.no, 2017). The circular economy is one of the leading principles that is addressed. Figure 3 shows the components that are the key points in a circular economy. The proposed strategy is hoped to facilitate a circular economy and wishes also to implement more measures that Avfall Norge presents in the "Roadmap for a circular economy". Among other things, the government will, work towards a strengthened market for secondary raw materials in cooperation with industry and the waste industry. (Avfall Norge, 2017). It is stated by the CEO of Avfall Norge, Nancy Strand, that there is a major importance in focusing on producer responsibility and that the government should be open to being in favor of increased producer responsibility for more waste types. Producer responsibility is set to be an effective tool for achieving goals in battle against increasing waste and the change in waste policy (Avfall Norge, 2017). In order to facilitate a circular economy, it is forthwith planned by the government to increase material recycling, determine requirements for the disposal of wet organic waste and plastics, and consider expanded producer responsibility for more types of waste.

2. Study objective and Hypotheses

2.1 Goals of the study

The thesis will delve into how the attitudes and behaviors of the students living in SiÅs dorms are acting towards the waste sorting systems in SiÅs's student housing Pentagon, Palisaden and Ponoma. It will focus on investigating factors that encourage or deter waste sorting and recycling among students living in their respective dorms. In addition to this, it will look at improvement areas to encourage higher student awareness/activity on recycling and higher degree of household waste sorting in the dorms. As a means to find out how to take these measures, it is also important to look at the background and attitudes of the students towards waste and how they differ from each other. This will likely have different influence on how they respond on waste management situation in the student housings.

A portion of the study is also a comparative study between new students and old students. Research by Gregson (2007), has found that saving and wasting are critical to materializing identities and the key social relations of family and home. Considering his observation, there is a possibility that in some parts of Norway households are better at sorting their waste than other areas, due to habits from better developed waste sorting and recycling systems. The study will look at these variables and see the significance of the students attitude and habits towards waste recycling

The household waste sorting system that existed in SiÅs dorms, might not be perceived as efficient as that of other places. From August 2017 a new system was implemented where students needed to sort their food waste in addition to the regular system of sorting paper, cardboard, glass and metal and MSW (Municipal Solid Waste). Approximately 400 new students moved into SiÅs dorms. Some of them met the new system right after moving in. The rest of the new students lived under the old waste sorting system until October. The key focus here is to conduct research on how the students react to this change and if the hypotheses of social relations of family and home is relative to how a person sorts and recycles and perceives waste management stand true.

2.2 Hypotheses

Up until October 2017, the food waste of the consumers in Ås was unsorted and discarded in residual waste. The decision to sort out the food waste from residual waste was approved in April 2016 (Follo Ren, 2017). This thesis is meant as a contribution to fill the knowledge gap between/of students' attitude of waste sorting habits and the barriers that hinder higher household waste sorting percentage in student dorms. In addition to that, this paper aimed to identify the demographic, situational and psychological contributors to the behavior as well as incentives that may improve the level of influences towards waste sorting. By providing exploratory empirical study, the role of collaborating with the students to develop an effective system might be answered with the help of the following hypotheses:

1 a) Recycling behavior and attitudes by students at SiÅs is influenced by their experiences from home situations and depending on their practices from home might be worsened by poor waste management systems at student dorms

1 b) Recycling behavior and attitudes and concern for environment by students varies between faculties, between new students and students that have been studying at NMBU at least one year or more

1c) Recycling behavior and attitudes by students can be improved through better and more information about how waste resources are recycled and used as resource

1 d) Recycling behavior and attitudes by students can be improved through weekly or monthly control and checking of the waste sorting situation at the dorms.

3. Literature review

3.1 Recycling behavior, attitude, habit and the different variables that can play a role in them

When looking at recycling behavior, attitudes and barriers in the participation among people, there has been conducted numerous studies within a number of disciplines with unique subject points from different subject areas. Attitude is a learned tendency that can respond in a favorable or unfavorable manner, negative or positive, towards a particular person, behavior or thing (Stoknes, 2015). The provision of recycling facilities to householders have expanded tremendously over the years and the requirements of sorting it have developed extensively and to some degree become more complex. Research by Herremans and Allwright (2000) indicated that posture, as a part of awareness and attitude, lead to action and performance regarding environmental management issues. Stoknes (2015) mentions five familial forces that is describing to how we consume and behave. They are self-interest, status, social imitation, short –termism, and risk vividness. He describes short-terminism as a fundamental barrier. People weigh present outcomes more important than distant ones. Literature related to recycling behavior and any behavioral studies related to the environment are as complex as they are diverse. Studies on waste recycling behavior has been conducted on since the 1970's (Brandt and Miafodzyeva, 2013). Although newer studies focus on trying to identify different factors as motivations, correlations, determinants, barriers, reasons for recycling behavior etc. Hornik et. al (1995) shows to older studies regarding household recycling that consists of two phases. Economic incentives and a number of demographic characteristics is focused on the first phase, in which also external monetary rewards was a basis into seeing if it could initiate or confirm recycling behavior. The latter phase of research studies which spanned from 1980 to 1993 concentrated on looking for ways to increase the long-term commitment to recycling (Brandt and Miafodzyeva, 2013).

Some of the ideas that Brandt and Miafodzyeva found are the basis of one of the hypothesis that I intend to affirm in this paper—that is, that the effect of social and psychological motivators for personal recycling behavior. In the research done by Wirtz (1994), he refers to Russell's circumflex of model that explores that, affect or the way people feel is the interceding variable between stimuli, cognitive processes and feedback behavior. In order to meet recycling targets, an online survey was conducted in 2009 on the transient student population at Oxford. They found that the recycling behavior of the students was influenced by situational variables such as provision of recycling box and the recycling behavior of family and friends. In their research, they also

discovered that the student's willingness to minimize waste was linked to psychological variables such as environmental concern (Robertson and Walkington, 2009). Brandt and Miafodzyeva (2012) demonstrated the variety of variables in studies that examined recycling behavior. However, they divided the variables in four categories: individual socio-demographic, technical-organizational, socio-psychological and study-specific. As recycling mainly relies on individual participation, it will consequently be difficult to develop effective and sustainable policies if there is a lack of knowledge about the factors that lead people to participate in the cause (Schultz et al., 1995). Collin et. al (2006) and Williams and Gunton (2007) highlighted in their research the importance of focusing on students as they usually have low incomes and are subjugated to no or little formal responsibility for waste management activities within a household, along with indicating that they have no established prior habits and potentially good opportunities as well. In accordance with the research question, this paper will mainly focus on the socio-demographic and socio-psychological variables among the students. This is done with respect to existing research in the categories and the literature study.

3.2 Socio demographic variables

Consumer survey done by Avfall Norge (2011) showed that different groups of people sort their waste differently. To describe the respondents' descriptive information and their distinctive characteristics that are associated with their lives, socio-demographic variables are taken into account. Socio-demographic variables include age, sex, education, ethnicity, marital status, household, employment and income. According to Brandt and Miafodzyeva (2013), the most studied socio-demographic variables that are studied in waste sorting and waste management researches are age, sex, education level, income, household type and ethnicity. Other variables in their study are family size, presence of emigrants and population density. They also mention that studies address socio-demographic characteristics of sampled populations, but there are not many that investigate the correlation between recycling behavior and socio-demographic factors.

In a study done by Vencatasawmy et.al (2000), they found that the tendency to recycle increases with age and increased education level. They also found slight differences between males and females who sorted and in their study it was women who responded to sorting more. Yet, their research did not find any significant relationship between other socio-demographic variables and

recycling tendencies. The research done by Brandt and Miafodzyeva (2013), shows that the results for relationship with age spreads between significant and not relevant. It is also indicated in their research that the more generalized the norm of recycling is in the society, the more insignificant age would be in correlation with recycling behavior. Pakpour et.al (2014) also found that recycling behavior increased with increasing age and education. A study in Norway (Walther-Zhang, 2014) regarding age and recycling habits, also found that adults over 50 years are best able to sort their electronic waste. But according to Saphores et al. (2006) it is middle aged adults between 36-65 years old that are more willing to participate in waste sorting and recycling. Also, Menses and Palacio (2005) regarded people whose age are far from the average age of the working population (around 31-50) who are less inclined to participate in recycling activities. It is the young people, people below 30 that are regarded as crummy participants of sorting and recycling waste (Kildahl, 2011).

Income is another variable that is frequently investigated. Hage and Söderholm (2008) suggested in their study of income elasticity that, the opportunity cost for the households must be taken into consideration when focusing on recycling habits. As recycling is a time consuming activity, the opportunity cost of recycling would increase with income. According to Barr et. al (2003), a person's situation at a given time has the ability to shape their environmental actions. Robertson ad Walkington (2009) found that several studies had reported a relationship between nuisance (where recycling is seen as too much trouble, too messy, taking up too much space and time) and recycling behaviour. In their meta-analysis Brandt and Miafodzyeva (2013), found that the majority of the studies found a correlation between income and sorting and recycling waste.

Nye and Burgess (2008) identified and stressed the importance of education and information in waste management in their research. Moreover, in the research done by the Brandt and Miafodzyeva (2013) education was identified as the third most studied social demographic variable when it comes to studies in source sorting of household waste. In the study done by Clay (2005) it is mentioned that education, youth and ownership of a single home are considered to be strongly related with good recycling behavior. The lack of adequate education regarding recycling and its benefits was also described in the research by Armijo de Vega et. al (2003) and showed that it limited the participation in recycling while also showed the success that is possible to

achieve when educators and students make an effort to increase recycling rates. The study done by Morgan and Hughes (2006) supports this summary as they also indicate that those who participate in sorting the waste are higher educated than others. Although the discoveries in the research done by Hagen and Söderholm (2008) found that the relationship between education and the source sorting of plastic waste was weak, the study does mention education as indicative towards recycling behavior. Walter-Zhang (2014) does not find education as a descriptive variable for recycling behavior and the collection of electronic waste in his research. But Halvorsen (2012), did find a strong relationship that the opportunity cost of time does have an influence in the households waste sorting practices, regardless of education level. Hagen and Söderholm's research (2008), also points towards this giving the idea that the more education an individual has the more likely they are to consider their time more valuable and thus choosing less time on sorting their waste compared to a lower educated individual.

In their analysis, Brandt and Miafodzyeva (2013), found that several studies discovered that women are more active and engage more readily in pro-environment behavior and are more persevering in activities related to waste. Robertson and Wallington (2009), also found in their research that female students reported a greater willingness to minimize waste than male students. But the reported amount of recycling was the same for both genders. Research done by Clay (2005) contradicts these findings and finds in his own research results that males show more likelihood to recycle at home and in University. He also mentions that a student's behavior to recycle relies more on individual initiation and dedication. This claim was also supported by the research done by Pakpour et al. (2014). Schultz et. al (1995) however, found while investigating correlations between gender and recycling tendencies of sorting waste that men and women are equally likely to recycle. Brandt and Miafodzyeva (2013) found that majority studies found no correlation between gender and waste sorting behavior.

The most homogenous but the less described socio-demographic variable in literature is dwelling type (Brandt and Miafodzyeva, 2013). In the study done by Halvorsen (2012) it is found that single housings in Norway have higher level of effort in the source sorting scheme. Brandt and Miafodzyeva's findings (2013) also support this result stating that private housing i.e. that of single-family dwellings influences recycling behavior in a positive manner. Their research also

found that dwelling type showed a significant correlation between recycling behavior and the dwelling type. Hage et al. (2008) explained this by outlining the space availability for sorting materials and also a higher general environmental concern.

3.3 Socio-psychological variables and Russell's circumflex model

Cognition refers to how we actually think and how the brain processes information. Among various things, cognitive psychologists explore how we think and judge available information to make opinions and decisions (Stoknes, 2015). According to Robertson and Walkington (2008), the greatest influence on a student's willingness to minimize waste are psychological variables. Brandt and Miafodzyeva (2013) discusses 7 different variables for this variable group in their research. They are general environmental concerns, moral norms, legal norms and social norms which are categorized as motivational factors. Then there is information and knowledge, past behavior and personal effort that are categorized as situational factors affecting sorting and recycling of waste. Their study highlights moral norms as the most significant and researched variable when it comes to looking at behavior towards waste sorting.

This claim was also supported by based on a earlier study conducted by Largo-Wight et al. (2012), which found moral obligation to be a significant factor when predicting recycling behavioral intention among undergraduate students in the US. Moral obligations or moral norms is defined as the perception of an individual's moral correctness or incorrectness of practicing a behavior (Ajzen 1991 and Pakpour 2014). Brandt and Miafodzyeva (2013) state that those who feel a higher obligation and personal responsibility have a higher chance of sorting and recycling. They conclude that moral norms are important when describing behavior towards waste sorting. This is further supported by a study in Brazilian households (Bortoleto et. al, 2012) where waste prevention behavior was seen to be influenced by perceptions of moral obligations. Halvorsen (2012) also notes how norms affect people's emotional response in relation to their perceived environmentally friendly actions.

People yearn for personal interaction and conversations to help them process and personify the information (Stoknes, 2015). Introducing messages that are relevant at a personal level or relatable to near environment while avoiding the debate of what is right, positive change can be induced.

When considering the application of social norms, Stoknes (2015) remarks that groups can and do nurture positive change. Nye and Burgess (2008) also indicates towards two motivational drivers when aiming to changing household behaviors in their study. One was the contact with like-minded others and the other was searching for information about how to live a greener life. Peer behavior is referred to as one of the strongest predictors of green behaviors and attitudes on topics like littering, energy and water use. He found in his research that the way of conveying messages play an important role. Brandt and Miafodzyeva (2013) also mentions social norm as a motivational factor that can influence recycling behavior. By presenting what positive differences or acts neighbors were doing in terms of recycling instead of plain moral exhortation, social norms were activated and curbside recycling increased by 19% (Stoknes, 2015). Association with peers is an evolutionary, emotional inner forces which according to Stoknes is stronger than rational self-interest.

When discussing barriers against the messages towards environmental change and benefits, Stoknes mentions five defense barriers, namely – distance, doom, dissonance, denial and identity. He emphasizes that these barriers are substantial and unyielding. Referring to changes and problems that are not in our surroundings, we distance the problem away from us and therefore the impacts seem distant to us. This hinders engagement towards positive initiatives such as recycling. Conveying the messages by framing it as an encroaching disaster that can only be addressed by loss, cost and sacrifice creates the wish to avoid the topic overall. In terms of dissonance, Stoknes mentions that lack of convenient behaviors and social support weaken positive attitudes towards environmental actions, in this case recycling. He also concludes that social relations determine our attitude in the long the run (Stoknes, 2015). Russell's circumflex model of affect, hold that affect or the way people feel is the determining variable between stimuli, cognitive processes and response behavior (Wirtz, 1994). It is often used to understand the environment-human and person to person interactions and explain consumer behavior. Wirtz (1994) found that research by Mehrabian and Rusell (1974) proposed the rate of information of a situation or an environment directly drove motivation. High information rates suggested to cause high levels of motivation whereas low level of information drove to cause low level of motivation. According to his finding in their research, information rate is the degree of novelty where novelty is referred to the unexpected and the unfamiliar. Complexity of the environment or the situation is also defined

as a part of information rate where complexity is explained as the number of elements and extent of change (Wirtz, 1994).

Walter-Zhang (2014) reports knowledge as an important factor for positive effect of recycling behavior. In his research he found that lack of knowledge would negatively affect the source sorting behavior for electronic waste. Brandt and Miafodzyeva (2013) also found strong significance between knowledge of recycling and waste sorting behavior. They refer to international research stating that knowledge and information are important for describing the participation and waste sorting behavior among individuals. Robertson and Walkington (2009) on the other hand states that there is lack of empirical support for the influence of environmental knowledge and recycling behavior and that it is mostly mixed.

Another variable mentioned in the research by Brandt and Miafodzyeva (2013), is general environmental concern. They conclude that even if a high level of environmental concern have the potential to directly influence positive recycling behavior, the findings are not homogenous. In their meta-analysis they found that environmental concern correlates with recycling behavior. Studies by Bruvoll et. al (2000) found that environmental concern was a significant predictor of actual recycling behavior. On the other hand, Brandt and Miafodzyeva (2013) mentions that as environmental problems are greatly covered in media, people may have learned a lot about the environment and consequences of actions without developing a corresponding behavioral action.

4.Methodology, data gathering and study objects

4.1 Research design

Defined by Pilot et al (2001) a research design is "the researcher's overall for answering the research question or testing the research hypothesis". The design designates a process of finding definitive answers or solutions to research problem and hypothesis. It will thus contain strategic considerations and tactical decisions (Grennes, 2001). In the pursuit of a solution, we can employ two major types of research designs- qualitative and quantitative. A third method is the combination of the two types and is called the mixed method. There are other classifications that can fall under any of these methods, namely- descriptive, explanatory or analytical, exploratory, experimental, historical and predictive types (Adebiyi and Abayomi, 2016). When the purpose of the research is to describe variables and relationships between them, one can take into account the quantitative research method and the descriptive design. The design must maintain that once one has a relatively clear hypothesis and that the hypothesis coincides with surveys (Grennes 2001). The qualitative approach is described by Burns and Grove (1999) as " a systematic subjective approach used to describe life experiences and situations to give them meaning". On the other hand, quantitative research examines the relationships between and among variables and the statistical description of the trends in the data in order to provide answers for the research question and hypothesis (Adebiyi and Abayomi, 2016). This research thus has a mixed design as a quantitative research is done for the data obtained, while qualitative research is used for the background knowledge and literature found. The method offers a compilation of formative research designs that may be fitting to support the examinations of budding ideas. A descriptive design is relevant to the thesis in this regard as well. It is the most used research design in today's social, market and organizational research as it is good at combining knowledge about respondents' properties with behavioral knowledge (Grennes 2001). In this paper for example, one of the matters that will be considered is how demographic parameters such as age and background correlates with the attitude and habits of the respondents.

4.2 Study objectives

4.2.1 Students and SiÅs Student Housings and the waste recycling system available

Studentsamskipnaden in Ås (in short SiÅs), was established in 1955 and is one of the 25 student associations in the country (SiÅs, 2017). SiÅs supports and covers the welfare needs of the students in the Norwegian University of Life Sciences. SiÅs assists in offering less expensive student dorms. The student housings of SiÅs is only for the students at NMBU. The dorms are normally furnished and students only need to bring the essentials, as kitchenware, duvet, pillow, beddings etc. SiÅs student housing is centrally located within walking/cycling distances to NMBU and it is quite easy to reach Ås center, shops and dining venues. They have 28 different apartment arrangements but this study is only conducted within 14 of these solutions. They have 1603 housing units.

SiÅs works towards a green development and to increase their measures to be more environmentally conscious and reduce the environmental impact- they have implemented several measures that help reduce the environmental impact. Among the various measures taken, some of the most noteworthy ones are the steps towards reduction of the use of paper by developing electronic invoice for state-owned enterprises, e-invoice and digital contracts/signature (SiÅs, 2017).

4.2.1.1 Recycling system

All student housings and dorms in SiÅs are subject to municipal waste collection by Follo Ren. In Pentagon and Palisaden the dorms are equipped with stations for cardboard/paper, glass and metal and residual waste. In Ponoma there is station for cardboard/paper, plastic and residual waste. Glass and metal is delivered in the containers in Pentagon. Although Follo Ren complies with the same kind of work and system in SiÅs housings as done in the rest of the municipality, SiÅs opted to not take advantage of the trial sorting system of source sorting the plastic from the residual waste when it came in 2015. This is because the system was a trial scheme that would be wound up (Mail, Marie Hesselberg Simonsen, 2017).

The students are given the responsibility to deliver special and electronic waste in the right place themselves. Rather than just throwing things away, it is possible that households can be consistent

in engaging in simultaneous practices of saving and recycling properly when it comes to throwing away consumed products (Gregson, 2007).

There is no solution for this kind of waste in SiÅs housings. In their website, SiÅs recommends delivering such waste at Bølstad Recycling Station. Other usable things that may be recycled, are further advised to be forwarded in UFF containers, flea markets, used stores etc. But there is no direct collection or delivery containers in SiÅs premises or the university area.

When the new solution was introduced, it was the same as other households in the municipality. The waste collection scheme is notably almost the same, except from the addition of sorting the food waste from residual waste. The food waste is to be sorted separately into green bags and thrown in the residual waste container outside the buildings and then the bags will be sorted out later in the waste facility. Follo Ren provided the green bags along with a separate basket to all SiÅs housings, which were delivered to the dorms gradually. When transitioning to the new solution, Follo Ren has tried to arrange for the students to get information. According to Marie H. Simonsen (2017 refer to mail), advisor to project and development in Follo Ren, baskets and green bags were taken to the Pentagon in July so the kitchens had this when new students moved in. Follo Ren also wrote the sorting guide in English and made in a format that could be hung on the inside of the kitchen cabinet. Before the rest of SiÅs's complexes received baskets and green bags, the sorting guide in PDF was sent to SiÅs together with a PDF explaining waste management in Ås in English as well. This was to be sent by mail to all students living with SiÅs.

4.2.2 Follo ren and energy and climate plan/recycling scheme for Ås municipality

Follo Ren IKS is the intergovernmental waste management company for the municipalities of Frogn, Nesodden Oppegård, Ski and Ås. It was established on January 1 1995 (Follo Ren, 2016). Their vision is to make follo greener with focus on citizens, sustainability and economy. The households had a container for residual waste and one for cardboard, paper and beverage carton. In addition, there are also return points for glass and metal packaging and clothes, shoes and textiles. Coarse waste is directed to be delivered to one of three recycling stations available. The residual waste containers are emptied every 2 weeks and the cardboard, paper and beverage container every 4 weeks. Taking the end-of-life course of materials into account, it is observed

that material recovery is a better solution than energy utilization, both in relation to the greenhouse effect and the total energy consumed (Lyng and Modahl 2011). At the end of 2011, Ås Municipality received new renovation solutions. New waste containers were distributed where two types of waste were to be sorted. One was for cardboard and paper and the other was for residual waste (Opheim, 2011).

It is more harmful for the environment to burn the plastic than to recycle it. By doing so one, exploits resources only once and avoids the potential to reuse it for several other purposes. For each ton of plastic that can be recovered, we avoid the release of 2 tons of CO_2 by combustion (Sandvik, 2016). But up until 2015, each household in Ås had a standard solution of a 240 l container for residual waste, food waste and plastic packaging and another of the same dimension for cardboard and paper. Ås MDG wanted to improve the waste management scheme in the municipality even further. It was therefore a positive change that a trial order for source sorting of plastic packaging began in August 2015 (Sandvik, 2016). Since then, the households in Ås have been given plastic bags for plastic collection. The trial ran until 1st October 2017 (Follo Ren, 2017). According to waste composition analyses of residual waste, the inhabitants of the municipality annually circulated about 22 kg of plastic packaging. Follo Ren had a goal to collect about 7 kg of plastic per capita per year with the new scheme (Sandvik, 2016). It was observed that the inhabitants in the municipality made a good effort and Follo Ren had many positive responses to the service. They reported an increase of 139% in source-sorted plastic packaging in November 2015 compared to November 2014 (Sandvik, 2016). But nevertheless, the total amount of plastic collected in 2016 was 607 tons which corresponds to 5,5 kg plastic packaging per capita for material recovery (Follo Ren, 2017). The waste composition analysis that they collected showed that only 6% of the collected plastic waste was mortar or made from other materials unsuitable for recycling. So, although the there was relatively high interest in sorting the plastic waste, the actual amount did not meet up to the goals set.

Of all the municipalities in the region, the municipality of Ås had the highest proportion of plastic (15%), glass and metal (7,9%) in the residual waste (Follo Ren, Waste Composition Analysis Report 2017). Therefore, the trial solution of sorting plastic ended and the plastic is now thrown with the residual waste and sorted into the ROAF's sorting facility. Their sorting facility is one of the most modern in Europe and has been in operation since 2014 (Follo Ren, Ofte stilte spørsmål). Follo Ren claims that the use of new technology gives even better results than before. According

to them the machines sort out plastic better than humans, and have the opportunity to extract three times more plastic at the sorting plant than it gets by source sorting at home. ROAF's figures and results show that they are getting more plastic from the waste than at standard source sorting at home. The figures from the waste composition analysis carried out in 2016 also supports this, which shows that about 5 kg of plastic per capita per year is obtained by sourcing in own bag. Whereas figures from ROAF show that they can obtain about 12 kg of plastic per capita per year (Follo Ren, FAQ). As a result, it is not necessary to put plastic in own bag anymore and it produces no further environmental impact. Thus, blue bags or personal bags are not handed out for plastic packaging in the areas Follo Ren handles.

4.3 Design of questionnaire and developing questions

The questionnaire for this paper is self-composed. The research questions and hypothesis are the basis for forming the questionnaire. The choices taken in formulating the questions are influenced by the goals of the research and sensitivity of the study i.e. characteristics, abilities, and resources or experiences of potential respondents. Designing and implementing a survey is a systematics process of collecting data for a particular topic through questions (Schaffer et.al 2010). Afterwards, the results are generalized to the groups it represents by the respondent. The five steps of designing and implementing a survey is shown in the figure below.
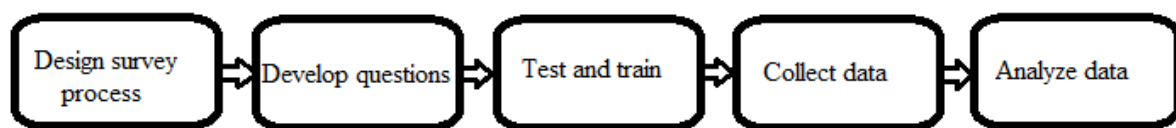
Figure 4: Process of designing and implementing a survey (Schaffer et. al 2010)

A survey is a measuring device for things that cannot be directly observed. In order for the results to be useful and meaningful, it is therefore needed to focus on two characteristics while developing the questions: reliability and validity (Schaffer et. al, 2010). It is important to keep the goal of the research in mind while also formulating the questions from the perspective of the

26

respondents. It was therefore aimed to make the design of the questions as simple as possible, clear and with an objective to prevent the respondents from misinterpreting the questions.

The questions in the questionnaire can be divided into three parts. The first 15 questions ask personal questions, helping to achieve a demographic data like gender, age, municipality of origin, faculty of study, which student dorm they reside in, type of student dorm, length of stay, which municipality they are from etc. The second part of the survey, focused on the respondent and their background knowledge, household behavior, attitudes, knowledge, satisfaction and commitment related to participation towards environment friendly actions and in source sorting in the dorms. The third part of the questionnaire focused on knowledge gaps, barriers and suggestion for measures of improvement. Four types of questions were used in the questionnaire.

1.Ticking off answer that applied to them from the given choices.

2. Answeing from a scale of 1-7 where 1 was strongly disagree or very bad and 7 was strongly agree or very good.

3. Answering with yes, no, maybe or don't know.

4. Open ended questions where respondents had the opportunity to fill in answers.

The open question provided the possibility to obtain more detailed views and information from the respondents. Selection of measurement scale sets guidelines for the types of statistical analysis methods that can be used for the dataset (Wenstøp 2006). A 7-point scale provided highly refined answers that had good structure and added detail to the data set and easy to interpret as well. Table 1 shows the two groups of factors, the variables being measured along with an example for each question.

Table 1: Factors, variables and measures used in the questionnaire

Factor	Variable	Measure
Demographic	Age, gender	Assigned numerical values for individual ty
Situational	Faculty, accommodation type and number of inhabitants, year of study, domestic recycling provision	Assigned numerical values for individual types and concept, for example- waste fractions sorted in family home: organic waste, cardboard and paper waste, plastic waste, Hazardous and electrical waste, Glass and metal, residual
	Normative beliefs for example reuse and recycling behavior of housemates, family and neighbors, sense of community	Likert scale (1-7, strongly disagree to strongly agree) for example,- my family at home has always been conscious and careful about sorting waste
Psychological	Personality and past experience, e.g. environmental awareness and concerns, environmental and source sorting knowledge, perceived barriers to recycling	Likert scale (1-7, strongly disagree to strongly agree) for example,- developed good waste sorting and recycling habits from home
	Expectations and attitude towards outcome to such as concern towards waste, attitude towards source sorting and recycling	Likert scale (1-7, very bad to very good) for example,- environmental benefits of sorting and recycling your waste

4.4 Pretesting of questionnaire

As a necessary step to ensure that the questionnaire is error free and that the survey is conducted with minimum amount of flaws and glitches, it is important to pretest the survey. It is an essential part of survey research. The goal is to improve the questionnaire so that it is easier and more understandable for the respondents to complete the survey. By conducting a pretest, there is a scope of improving the way the questions are formulated to a more understandable pattern by adding or removing any questions that seems necessary or unnecessary respectively. Any confusions related to the questions are also removed in the process. When conducting the survey if there are any confusions to what the question means or how to answer it, it will affect the respondent's answers and also the accuracy of results of the data. As a result there will arise an uncertainty in the reliability of the data. It is therefore crucial that one or more pretests are conducted.

In order to assure the quality of the questionnaire and check if there were anything missing, a test was conducted by three respondents with somewhat the same characteristics and background. The feedback received from the testing respondents was insightful and constructive, which led to the elimination of some repetitive questions and,- addition of other questions they felt were relevant or needed to be answered. Along with these changes, some questions were reformulated so as to make it easier for the respondent to answer and receive the type of answer needed for the question.

4.5 Execution of the survey

The survey was distributed through email-addresses by Questback. The e-mail addresses were provided by SiÅs from their database of all current tenants. It was sent out to 1179 residents of SiÅs. The survey period was set initially to be for 10 days and then extended to 14. It was conducted between week 40 and 41 in October. The new sorting system was newly implemented in some of the student dorms and the rest of the student dorms received it between week 43-45. This fact was necessary to take into account for a proper evaluation of the system by the students and the answers and results to be more adequate. It was also necessary to consider if some percentage of the students would be on informal leave due to fall vacation in schools and high schools.

4.6 Computing program and preparation of the data set before analysis

The survey resulted in a collection of 288 respondents in total. For the analytical research part of this thesis IBM SPSS Analytics 24 was used as the analytical tool. This software offers a platform for advanced statistical analysis, text analysis, open source extensibility, integration with big data and is seamless in deployment into applications (IBM SPSS software).

4.7 Statistical tests used in the analysis

A total of 288 students responded to the survey which is represents a response rate of 24,4%. Although the response rate is low, the results represent a significant number of students living in the survey area.

The results are based on the analysis of the data from the survey and only the significant results that were relevant to the hypotheses are used in further in the paper. The overall aim of the statistical analysis was to observe and measure the extent to which demographic, socio-psychological and situational factors impact on the claimed level of recycling and willingness to change situation and minimize waste. Walter-Zhang (2014) mentions in his research that descriptive analysis is the basic statistical analysis for quantitative data. Of the data that is collected, descriptive analysis describes the main features and provide simple summaries of the collected data. For the evaluation of the data that were collected, descriptive analysis and Chi-square test analysis was carried out and the outcomes can be observed in the tables presented in the following sections. The results from the descriptive analysis of some of the different variables that are evaluated in the results are given in appendix 2.

Chi square analysis compare the expected and the observed distribution of data across categories. The greater the difference between the expected distribution and the actual distribution observed, the larger the Chi-square statistics. The statistical significance of the Chi-square test is determined by the p-value. It indicates whether the difference between the data is real or random. According to U.S. Geological Surveys in short USGS (2017), a p-value of 0,05 or smaller is generally used to indicate significance in social science research (USGS, 2017). It is important to notice that p-values are sensitive to sample size. In addition, it is necessary to understand effect sizes in order to identify if the significant differences that occur with large sample sizes are meaningful or not. Phi or Cramer's V for Chi-square analyses can measure the effect sizes (USGS, 2017). They show the differences in the data and demonstrate practical differences and not only statistical differences.

USGS (2017) refers to Murphy and Myors (1998) while describing effect size as "*as a measurement of the amount of impact an independent variable has on a dependent variable*". The illustration of interpreting the effect sizes phi and Cramer's V, Cohen (1988) has given the following guidelines- a small effect is 0,1, a medium effect if results are around 0,3 and a large effect if 0,5 (USGS, 2017). Another assumption for Chi-square analysis accordiong to Michael (Crosstabulations and Chi Square, p. 2) is that the test is based on an approximation that works best when the expected frequencies are great. In his paper he mentions that, expected count should not be less than 1 and no more than 20% of the expected frequencies should be less than 5 (Michael, u.d. p 2). According to Dr. Daniel Boduszek (2013), it might be misleading to examine percentages in the contingency table and expected frequency table when interpreting which cells produced the statistically significant difference. According to him, it is more reliable to use the residual, or the difference, between the observed frequency and the expected frequency as an indicator, especially if the residual is converted to a z-score and compared to a critical value equivalent to the alpha for the problem (Boduszek, 2013). Sharpe (2015) quotes Agresti (2007) to explain the importance of residuals, "a cell-by-cell comparison of observed and estimated expected frequencies helps us to better understand the nature of the evidence" and cells with large residuals "show a greater discrepancy…than we would expect if the variables were truly independent (p. 38)."(Sharpe, 2015). He also directs towards the Bonferroni method to adjust the z-tests.   For some of the relevant data a Fisher's exact test was run to confirm that the null hypothesis can be rejected in the cases when the value of cells with expected count less than 5 was higher than 20%. Fisher's exact test is used to test the significance of statistical comparisons. The test is useful for categorical data (Connelly, 2016).

5. Results

5.1 Attitudes and behavior towards waste sorting and recycling

Attitudes and behavior among the students vary between knowledge, belief and social interactions. Table 2 shows the number of students who are sceptic to the benefits of waste sorting for the environment.

Table 2: Frequency table of students response to not finding waste sorting beneficial for the environment

	Do not find that waste sorting and recycling is very beneficial for the environment as claimed			
Valid		**Frequency**	**Percent**	**Valid percent**
	Low (<= 2)	220	76,4	76,7
	Medium (3- 5)	48	16,7	16,7
	High (6-10)	10	3,5	3,5
	Other	9	3,1	3,1
	Total	287	99,7	100,0
Missing		1	0,3	
Total		288	100,0	

Table 2 shows the number of students who find the statement of do finding that waste sorting and recycling is very beneficial for the environment as claimed. Only 3,1% of the students highly agree with the statement in contrary to 76,4% of the students who highly disagree with the statement. The results indicate a positive attitude towards waste sorting among the respondents.

The results from the following sub-chapter answers if there are any relationship between social demographic and social psychological characteristics associated with students households of SiÅs that were surveyed and their sorting behavior towards waste, especially organic waste. The sub chapters 5.2.1-5.2.5 takes both social demographic and the socio-psychological variables to account when comparing the responses to the different questions.

5.2 Relationship between social demographic and social sociological characteristics in source sorting and recycling behavior

5.2.1 Comparison between past experiences & habits with demographic variables influencing the responses

Tabel 3: Crosstabulation between different independent variables and gender

Good habits from home			Chi Square test				
	Male	**Female**	X²	df	p	Cramer's V	Expected count
			8,566	3	0,036	0,173	Min. 0,67 (37,5%)>5
Low (<2)	28,6%	71,4%					
Medium (3-5)	45,8%	54,2%					
High (6-7)	28,9%	71,1%					
Don't know	20,0%	66,7%					
Total	33,6%	66,4%					
Concerned with environmental challenges and proper recycling							
			11,235	3	0,011	0,198	Min. 1,09 (33,3%)>5
Low (<2)	50,0%	50,0%					
Medium (3-5)	47,9%	52,1%					
High (6-7)	27,6%	72,4%					
Don't know	50,0%	50,0%					
Total	33,6%	66,4%					
Sufficient knowledge sorting and recycling of waste							
			1,061	3	0,787	0,061	Min. 7,05 0,0%>5
Low (≤ 2)	28,6%	71,4%					
Medium (3-5)	32,0%	68,0%					
High (6-7)	37,3%	62,7%					
Don't know	31,7%	68,3%					
Total	33,6%	66,4%					

In the analysis observed between good habits from home and gender in table 3, the Chi square analysis gives as $\chi^2 = 8,566$ and p<0,036. This is less than p≤ 0,05 which is what we need to reject the null hypothesis. There is indication to state that there is significant relationship between good habits from home and gender. Cramer's V is 0,173 that indicate that the size of the effect is small. Hence, we can state that the impact of good habits from home is weak between gender. A pairwise z-test post hoc analysis in excel with Bonferroni correction revealed that only males and females with average good habits or high level of good habits accounted for a significant difference.

But then again, the expected count is 37,7% which violate the assumption (no more than 20% of the expected frequencies should be less than 5) therefore the analysis for this variable is not robust. To affirm the significance Fisher's exact test was run which resulted in a value of p= 0,033 which is less than <0,05, therefore the null hypothesis can be rejected.
Gender is also dependent on concern with environmental challenges and proper recycling according to the results from the Chi-square analysis. Here $\chi^2 = 11,235$ and p= 0,011. Fisher's exact test gives value of p= 0,004. So the null hypothesis can be rejected. However, the impact of concern on gender is small according to the value of Cramer's V= 0,198. A pairwise z-test post hoc analysis in excel with Bonferroni correction revealved that only male and female, especially, females (by looking at the percentages) with average and high concern of environmental challenges and proper recycling constitutes the largest significance.

For knowledge, the null hypothesis cannot be rejected. The results from the analysis $\chi^2 = 1,061$ and p =0,787 demonstrates that the two variables are independent from each other. Cramer'V value is also significantly small and therefore the impact of the effect size is weak.

However, knowledge across the type of student dorm does have a significant association.
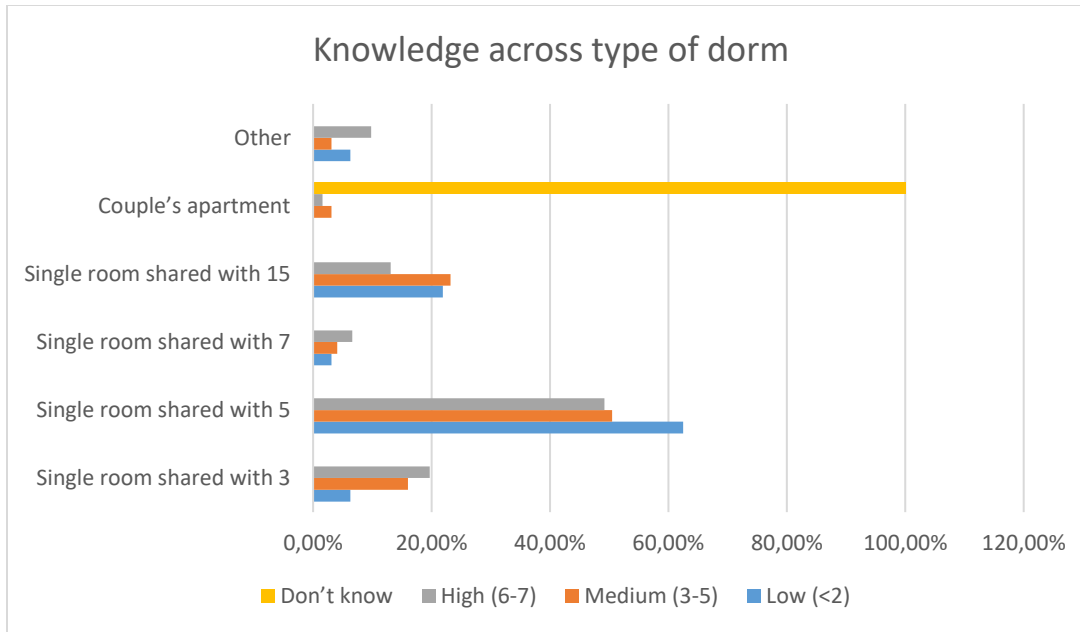
Figure 5: Comparison of level of knowledge across type of dorm

Chi square analysis test gives, χ^2 = 47,081 and p<0,001. Thus rejecting the null hypothesis. Cramer's V= 0,233 which indicates that there is a weak impact between the variable.

Table 4: Crosstabulation between age and good habits from home

Comparison with age					Chi Square test				
Good habits	18-20	21-23	24-26	27-29	30 or more	X²	df	p	Cramer's V	Expected count
						18,229a	12	0,109	0,145	Min.0,05 (60%)<5
Low (≤2)	28,6%	21,4%	35,7%	0,0%	14,3%					
Medium (3-5)	26,5%	48,2%	20,5%	2,4%	2,4%					
High (6-7)	34,9%	45,0%	15,3%	3,2%	1,6%					
Don't know	50,0%	0,0%	50,0%	0,0%	0,0%					
Total	32,3%	44,4%	18,1%	2,8%	2,4%					

There was not found any relations between age and the other different variables. Table 4 shows cross tabulation between good habits from home and age. There is no association that can be observed between the two variables. χ^2 = 18,229 and p is >0,05. The results violates the

assumptions for the analysis as 60% of the cells have have a value less than 5 and the expected count is very small as well. From the responses it can however be noticed that it is individuals between the ages 21-23 who mainly reports to have good habits.

The following table displays the number of sorted waste fractions in the home municipalities of the students. As there is no available data for the sorted fractions for the municipalities the international students come from, the respondents with international background are sorted according to continent of origin.

In terms of level of education, there was no significant association observed between any of the compared variables above.

Table 5: Frequency table of waste fractions sorted in the home municipalities of the students.

Frequency of waste fractions sorted in the home municipalities of the students				
Valid		Frequency	Percent	Valid percent
	Low (≤ 2)	83	28,8	29,9
	Medium (3- 5)	167	58,0	60,1
	High (6-10)	3	1,0	1,1
	International (North America)	4	1,4	1,4
	International (Asia & Africa)	2	0,7	0,7
	International (Europe)	11	3,8	4,0
	Germany	8	2,8	2,9
	Total	278	96,5	100,0
Missing		10	3,5	
Total		288	100,0	

The table shows the frequency of sorted waste fractions from the municipality of the students. The municipalities who has up till 2 fractions the waste is sorted is categorized as low. The municipalities with where the waste is sorted between 3-5 fractions are categorized as medium and the municipalities where the waste is sorted into more 6 or more fractions is categorized as high.

The data[1] from the responses gave the following results, which gives an overview of the background of the students and the sorting system they are used to from home. As a press release published in 2013 by EEA (2016) states that Germany was one of the countries that had highest recycling rate for municipal waste throughout Europe in 2010, the students from this country is therefore singled out from the other countries of Europe to assess if there are any significant differences in their responses. There are 10 missing values in the response, as there seems to be a knowledge gap between understanding of municipality and county. The valid percent shows the percentage variations of the given responses.
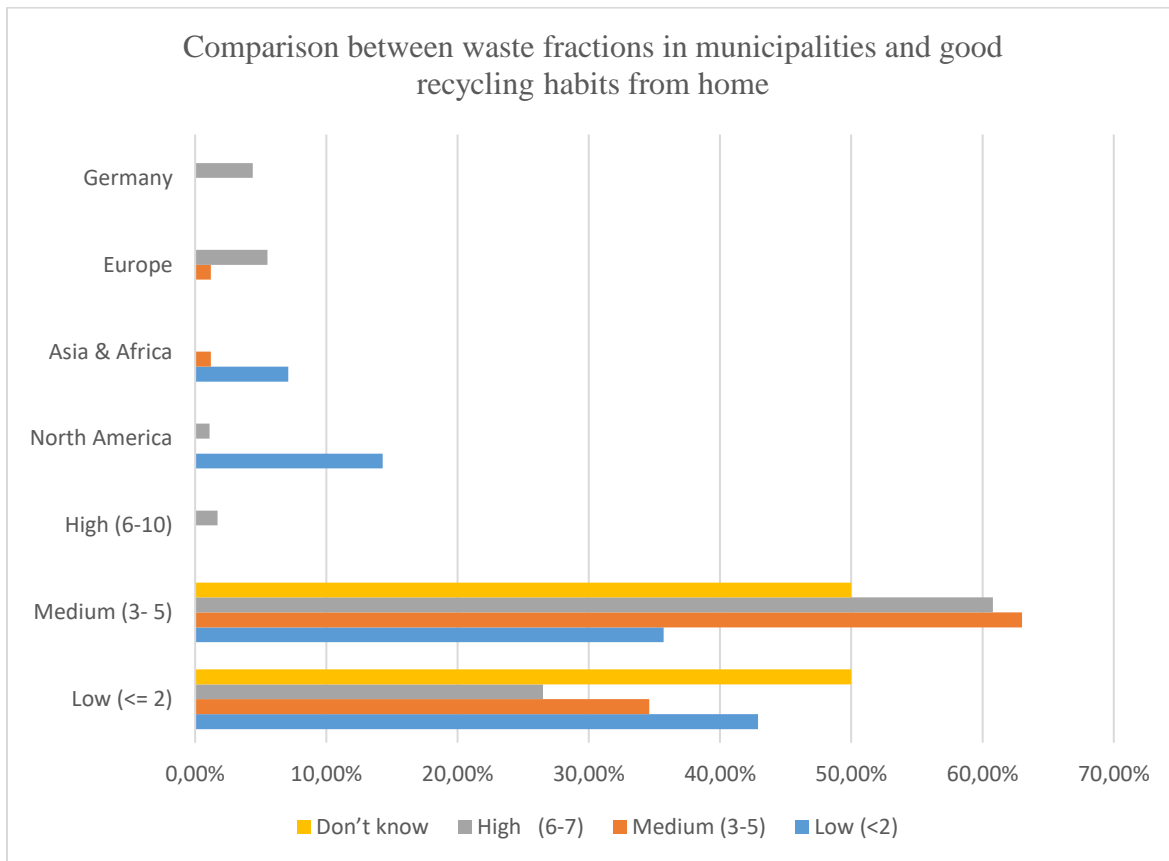
Figure 6: Comparison between good habits from home and the sorted fractions of waste in home municipalities where low represents municipalities with up to two sorted waste fractions, medium is between 3-5 sorted fractions of waste and high is 6 or more.

---

[1] The data for the number of fractions of waste that are sorted in the home municipalities of the students are brought from dataset provided by advisor at Statistics Norway Eva Vinju and sortere.no (https://sortere.no/privat/info)

The results of the Chi-square analysis are $\chi^2= 30,336$ and p<0,001 hence the evidence support the rejection of the null hypothesis is valid. This shows that there is an association between these two variables. The analysis has a cell count more than 20. 75% cells had expected count less than <5 and the minimum expected count is 0,01. This violates our assumptions for the Chi-square analysis and therefore the results are not robust at all. A fisher's exact test was ran to support the findings and value obtained was p= 0,012 which is <0,05 and therefore the null hypothesis is rejected. An explanation of such large amount of cells having a count <5 may be due to categories in the continents that are underrepresented and therefore there are large gaps in the data of expected value and counted value.

5.2.2 Comparison between past experiences & habits with socio-psychological variables

The results from the analysis of comparisons between good waste habits from home and different socio-psychological variables are listed below. The results indicates that the students respond to relatively high source sorting behavior from experience. One can observe in table 6 that 73,4% of the respondents report to have high waste sorting habits from home and families who are highly concerned about sorting the waste.

Tabele 6: Cross tabulation and Chi square test between inherent good habit and significant socio psychological variables

Family consciousness towards waste				Chi Square test				
Good Habit	Low (≤2)	Medium (3-5)	High (6-7)	Other	X²	df	p	Cramer's V	Expected count
					182,820	6	0,000	0,564	Min. 0,18 (41,7%)<5
Low (≤2)	92,9%	7,1%	0,0%						
Medium (3-5)	10,8%	62,7%	26,5%						
High (6-7)	1,6%	25,0%	73,4%						
Don't know	50,0%	50,0%	0,0%						
Total	9,1%	35,2%	55,7%						
Concern with environmental challenges and proper recycling									
					61,597	9	0,000	0,267	Min. 0,01 (62,5%)<5
Low (≤2)	28,6%	21,4%	50,0%	0,0%					
Medium (3-5)	3,6%	41,0%	53,0%	2,4%					
High (6-7)	0,5%	18,5%	81,0%	0,0%					
Don't know	0,0%	50,0%	50,0%	0,0%					
Total	2,8%	25,3%	71,2%	0,7%					
The sorting and recycle system in my home county is far better than that of my current housing									
						9	0,000	0,233	Min. 0,23 43,8%<5
Low (≤2)	50,0%	28,6%	7,1%	14,3%	46,957				
Medium (3-5)	10,8%	34,9%	28,9%	25,3%					
High (6-7)	9,5%	36,5%	36,5%	17,5%					
Don't know	100,0%	0,0%	0,0%	0,0%					
Total	11,5%	33,0%	37,8%	17,7%					

The Chi-square test of independence in SPSS gives χ^2 =182,820 and p<0,001. As it is less than p≤ 0,05 the null hypothesis can be rejected. Hence, there is significant evidence to conclude that good habits from home for students are significant to family awareness for waste sorting. Cramer's V has a value of 0,564 that indicate that the size of the effect is large. Therefore, we can state that the impact of good habits from home is large on the family consciousness towards waste recycling. Looking at the cells of counted and expected value (see appendix 3), the high level of independent variable i.e. the ones who responded to having high sorting habits seems to be accounting the most for the high level of family consciousness towards waste. But then again, the expected count is 41,7% which directs that the assumption (no more than 20% of the expected frequencies should be less than 5) is violated and hence the analysis for this variable is not robust. This may be due to number of cells of actual count that exceeded the expected count. Another factor that may be a reason is the number of respondents who said they did not know or responded to others.

The same interpretation is observed about the other variables that are compared with inherent good habits. The results show, there is a relationship between having good habits and being concerned about environmental challenges and proper recycling. SPSS gives χ^2 =61,597 and p<0,001. Cramer's V value of 0,267 indicate that there is a weak impact of good habits on the individual concern towards environmental challenges.

While there is a significant association between having good habits and the existence of a good sorting system from home county, the Cramer's V value indicated that the effect size is weak. The respondents report high level concern towards environment and rather positive sorting habits.

Table 7: Cross tabulation between good habits from home a worsened waste sorting habits after moving to SiÅs.

Worsened waste sorting habits after moving to SiÅs				Chi Square test				
Developed good habits	Low (≤2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					24,536	9	0,004	0,169	Min.0,02 (56,3%)<5
Low (≤2)	57,1%	7,1%	28,6%	7,1%					
Medium (3-5)	45,8%	36,1%	18,1%	0,0%					
High (6-7)	33,9%	28,0%	37,0%	1,1%					
Don't know	0,0%	100,0%	0,0%	0,0%					
Total	38,2%	29,9%	30,9%	1,0%					

The Chi square test analysis gives $\chi^2 = 24,536$ and p = 0,004. This indicates a significant association between the two variables and therefore the null hypothesis that there is no relation between developed good waste sorting habits from home and worsened waste sorting habits after moving to SiÅs can be rejected. Cramer's V value of 0,169 directs that the relationship between having developed good habits from home and worsened habits after moving to SiÅs is weak. Due to violation of the data size assumption (expected cell count <5 =56,3%) fisher's exact test was conducted. This gave a value of p = 0,02 therefore the rejection of the null hypothesis is valid.

Table 8: Cross tabulation and Chi square test between inspiration by co-habitants to be environmentally friendly and age.

Comparison with age					Chi Square test				
Co-habitants inspire to be environmentally conscious	18-20	21-23	24-26	27-29	30 or more	X²	df	p	Cramer's V	Expected count
						13,397	12	0,341	0,125	Min.0,39 (45%)<5
Low (≤2)	33,8%	43,1%	18,5%	3,1%	1,5%					
Medium (3-5)	35,0%	43,9%	17,2%	2,5%	1,3%					

High (6-7)	23,4%	53,2%	17,0%	2,1%	4,3%					
Don't know	31,3%	25,0%	25,0%	6,3%	12,5%					
Total	32,6%	44,2%	17,9%	2,8%	2,5%					

The results from the table demonstrates the relation between age and inspiration by cohabitants to be environmentally friendly. χ^2 =13,397and p= 0,341, therefore the null hypothesis stands and there is no association between age and inspiration from cohabitants. Cramer's V value of 0,125 indicates a small size of effect between these two variables. However, it can be observed that the same age group (21-23) whom had good habits from home highly agreed to being inspired by cohabitants to be environmentally friendly.

Table 9: Cross tabulation and Chi square test comparing inspiration to be environmentally conscious by cohabitants and improved waste sorting habits after moving to Ås

Improved waste sorting habits after moving to Ås				**Chi Square test**				
Co habitants inspire to be environmentally conscious	**Low (≤2)**	**Medium (3-5)**	**High (6-7)**	X²	df	p	Cramer's V	Expected count
				40,965	6	0,000	0,268	Min.2,36 (8,3%)<5
Low (≤2)	70,8%	27,7%	1,5%					
Medium (3-5)	45,2%	42,0%	12,7%					
High (6-7)	23,4%	40,4%	36,2%					
Don't know	31,3%	43,8%	25,0%					
Total	46,7%	38,6%	14,7%					

Table 9 displays that there is an association between inspiration by cohabitants to be environmentally friendly and improved waste sorting habits after moving to Ås. χ^2 = 40,965 and p<0,001 which means we can reject the null hypothesis and say that there is a relation between the two variables. Cramer's V = 0,268 which suggests that there is a low to medium size of effect of the variables. The minimum expected count is <1 and the number of cells that expected count less than 5 is >20%, which indicates that this is a robust test.

5.2.3 Comparison between newly admitted students and student's studying for a longer period in NMBU

The results from the table 10 and tables X in appendix 4 indicate that there is no significant relation between perception of satisfaction level with the sorting systems and the period of study in NMBU. The variables between satisfaction towards the sorting system among new students who moved into SiÅs and students who had been living there for a longer time are independent as well.

Table 10: Cross tabulation between years studied in NMBU and satisfaction level of the new sorting system (if implemented).

Satisfaction level with the new sorting system				Chi Square test				
Years in NMBU	Low (≤2)	Medium (3-5)	High (6-7)	Doesn't apply	X²	df	p	Cramer's V	Expected count
					1,194	6	0,977	0,064	Min. 1,83 (8,3%)<5
New (<1)	7,3%	34,5%	22,7%	35,5%					
1-3 years	4,8%	34,0%	22,4%	38,8%					
4+ years	6,5%	32,3%	19,4%	41,9%					

χ^2 =1,194 and p = 0,977. Cramer's V value of 0,064 show that there is a low or negligible impact between how many years the students has been studying in NMBU and how content they are with the new sorting system. One can however notice that the number of respondents who did not have the new sorting system at the time of survey and therefore the new sorting system does not apply, is relatively high.

Table 11: Cross tabulation between years in NMBU and the existing system at the time of the survey

Satisfaction level with the existing system				Chi Square test				
Years in NMBU	Low (≤2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					8,918	6	0,178	0,124	Min. 0,32. (25,0%)<5

New (<1)	16,4%	59,1%	24,5%	0,0%						
1-3 years	20,4%	54,4%	23,1%	2,0%						
4+ years	6,5%	77,4%	16,1%	0,0%						
Total	17,4%	58,7%	22,9%	1,0%						

There is no association that can be observed. The amount of time the student has studied in NMBU does not depend on satisfaction with the waste sorting system that was available to them at the time when the survey was undertaken.

No relation between the sorting habits was found across faculty among the respondents. When comparing worsened sorting habit and faculty, a Chi square analysis gave $\chi^2 = 27,895$ and p = 0,064. The two variables are independent from each other.

Table 12: Cross tabulation between knowledge of sorting waste and years studied in NMBU

Years in NMBU						**Chi square test**				
Knowledge of sorting waste	New	1-2 years	3 years	4 years	5 or more years	X²	df	p	Cramer's V	Expected count
						21,307	12	0,046	0,157	Min.0,66 (35%)>5
Low (<2)	47,6%	38,1%	4,8%	9,5%	0,0%					
Medium (3-5)	29,0%	48,0%	14,0%	4,0%	5,0%					
High (6-7)	38,5%	27,9%	19,2%	10,6%	3,8%					
Don't know	49,2%	28,6%	14,3%	7,9%	0,0%					
Total	38,2%	35,8%	15,3%	7,6%	3,1%					

Although there was no significant association noted between sorting behavior and attitude and the comparison between how long they had been studying in NMBU, it differed for the variable of knowledge. Cramer's V = 0,157 indicate a weak impact between the variables, but the Chi square test $\chi^2 = 21,307$ and p = 0,046 does show evidence of significant association between the variables.

The following figure shows the trend of the results on perception of sorting and recycling beenficial across the faculties.
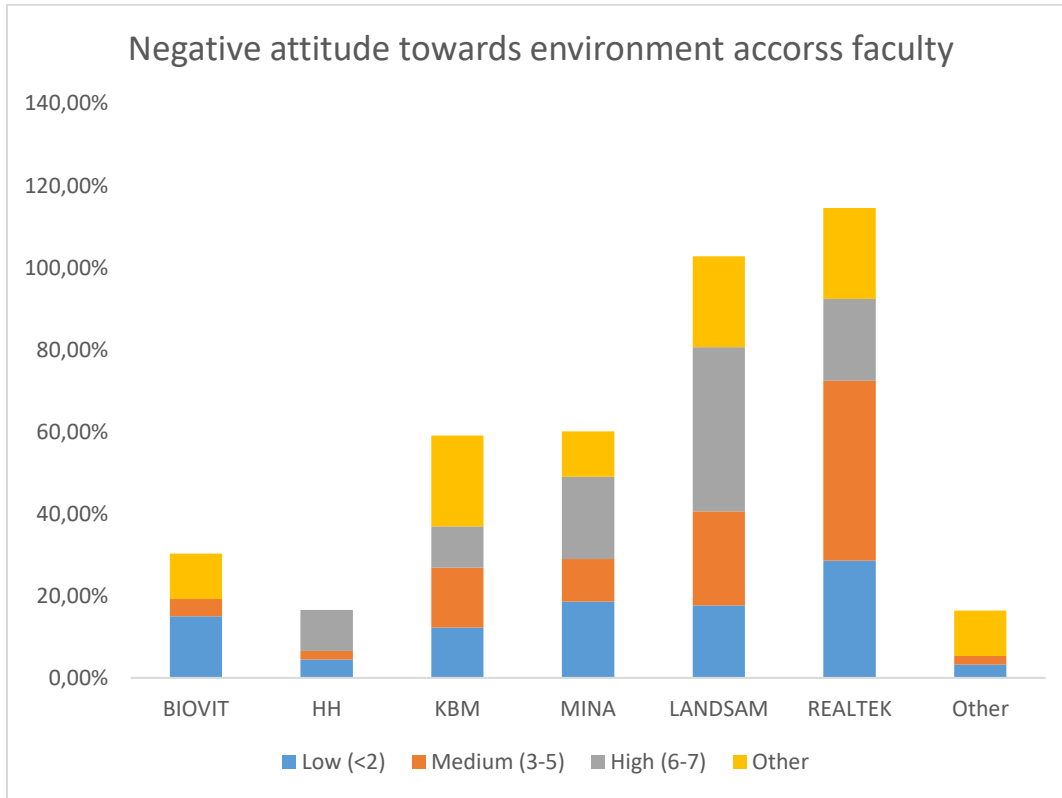
Figure 7: Negative attitude compared with faculty

There was no significant relation found between negative attitude towards environment and faculty. The null hypothesis can not be rejected as $p = 0,448$ and therefore we can conclude that there is not enough statistical evidence to conclude that negative attitude varies across faculties for this sample. The expected count of the cells are 57,1%<5 which violates the assumptions. The number of respondents from each faculty is underrepresented in the response, and might have affected the outcome and difference between actual count and expected count.

5.2.4 Comparison between students and knowledge level and willingness to sort waste
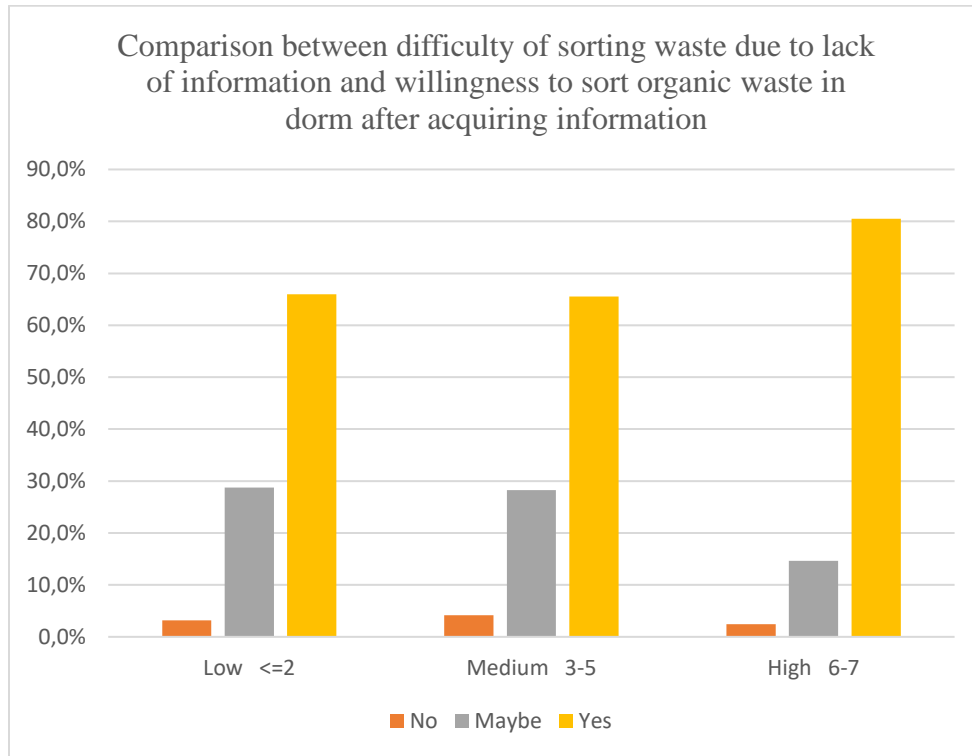
Figure 8: Comparison between difficulty of sorting waste due to lack of information and willingness to sort organic waste in dorm after acquiring information

There was no significant association between the difficulty of sorting waste in the dorms due to lack of information and the willingness to sort organic waste if more information was provided. The Chi- square analysis test presents χ^2= 9,419 and p = 0,400. Cramer's V= 0,104 indicates that the impact between the two variables is weak. The figure above shows the relationship between the two variables. It can be observed from the figure that the overall willingness to increase effort in sorting the food waste is high. Whether or not if the students find it difficult to sort their waste due to lack of proper information, by increased knowledge of the benefit of sorting the food waste the motivation is positive.

Table 13: Frequency to response of question 38, willingness to put more effort to sort the food waste if there was increased knowledge of benefit of sorting organic waste.

	Frequency	Percent	Valid Percent	Cumulative Percent
No	11	3,8	3,8	71,2
Maybe	76	26,4	26,4	97,6
Yes	194	67,4	67,4	67,4
N/A	7	2,4	2,4	100
Total	288	100	100	

The frequency table shows the response on willingness to put more effort to sort the food waste if there was increased knowledge of benefit sorting organic waste. Overall, there is a positive response to increased knowledge of benefit and willingness to put more effort or it being a motivational factor. It is observed that out of 288 respondents 194 said yes, 76 respondents replied maybe and only 11 replied no.

Table 14: Cross tabulation of those who don't find waste sorting beneficial for the environment and demand for increased information and weekly check-up

Increased information and Weekly-checkups					Chi Square test				
Don't find waste sorting beneficial for the environment	**Low (≤2)**	**Medium (3-5)**	**High (6-7)**	**Don't know**	X^2	df	p	Cramer's V	Expected count
					18,501	9	0,030	0,147	Min.0,47 (56,3%)>5
Low (≤2)	22,7%	48,2%	25,0%	4,1%					

Medium (3-5)	33,3%	45,8%	16,7%	4,2%					
High (6-7)	40,0%	40,0%	0,0%	20,0%					
Don't know	22,2%	55,6%	0,0%	22,2%					
Total	25,1%	47,7%	22,0%	5,2%					

The following table shows that there is an association between increased information and weekly checkup and not finding waste sorting beneficial for the environment. χ^2= 18,501 and p = 0,030. Cramer's V =0,147 which indicates a weak effect size of the variable. It can thus be said that increasing information and implementation of weekly checkup does depend on being wary of the benefits of sorting waste. A total of 47,7 % students who don't find waste sorting beneficial for the environment thought that by increasing information and implementing weekly checkup the waste sorting in the dorm could be improved adequately.

The table below shows comparison between those who are sceptic or do not believe in the benefit of sorting waste and their response to willingness to put more effort into sorting food waste after obtaining more information.

Table 15: Cross tabulation between not believing in the environmental gain of sorting waste and willingness to sort food waste after acquiring knowledge.

Knowing the benefit of sorting food waste					Chi Square test				
Don't find waste sorting beneficial	No	Maybe	Yes	Don't know	X²	df	p	Cramer's V	Expected count
					24,390	9	0,004	0,292	Min.0,22 (50%)>5
Low (≤2)	1,8%	22,7%	72,7%	2,7%					
Medium (3-5)	8,3%	37,5%	52,1%	2,1%					
High (6-7)	20,0%	30,0%	50,0%	0,0%					
Don't know	11,1%	55,6%	33,3%	0,0%					
Total	67,2%	3,8%	26,5%	2,4%					

χ^2= 24,390 and p = 0,004 and therefore the null hypothesis can be rejected and it can be concluded that there is an association between the two variables. Cramer's V= 0,292 which suggest a weak

effect size. Fisher's exact test was ran for this analysis as expected count of variables that counted less than 5 was 50%. Fisher's exact test gave a value of p= 0,003 and therefore we can still reject the null hypothesis. A pairwise z-test post hoc analysis in excel with Bonferroni correction revealed that individuals who highly disagreed with that there is no environmental benefit by sorting and recycling waste constitutes the largest significance on those who showed willingness (said yes) to put effort on sorting waste after knowledge of benefit.
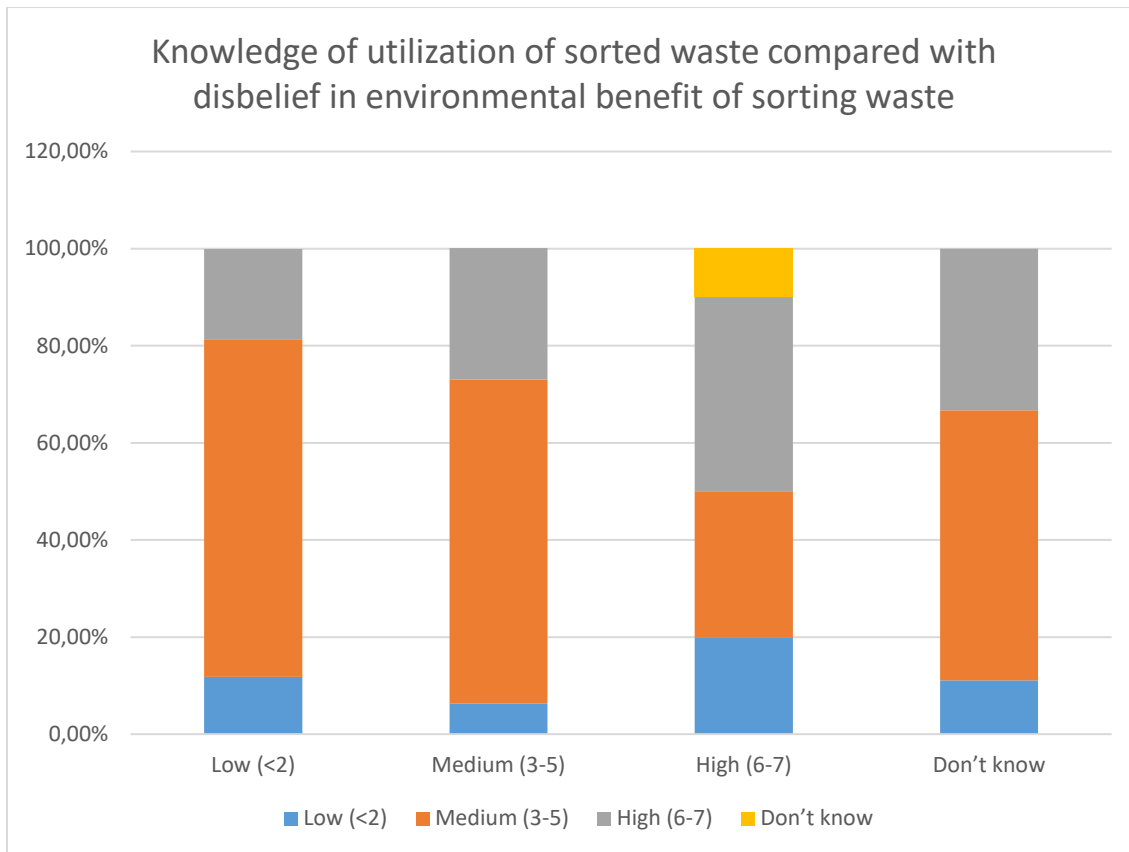
Figure 9: Comparison of distribution of knowledge of utilization of sorted waste with disbelief in environmental benefit from cross tabulation data.

The figure shows how the variation is between the two variables of knowledge of utilization of sorted waste and negative attitude towards the said benefit of sorting and recycling waste. The Chi square value for this analysis was χ^2= 35,693 and p<0,001. The null hypothesis can thus be rejected and it can be concluded that there is an association between the two variables. Cramer's V= 0,204 which indicates a weak size of effect of the variables.

5.2.5 Comparison of different barriers and measures with demographic and socio-psychological variables

What condition do you regard as the most important barrier for waste sorting in your dorm (select only one)?
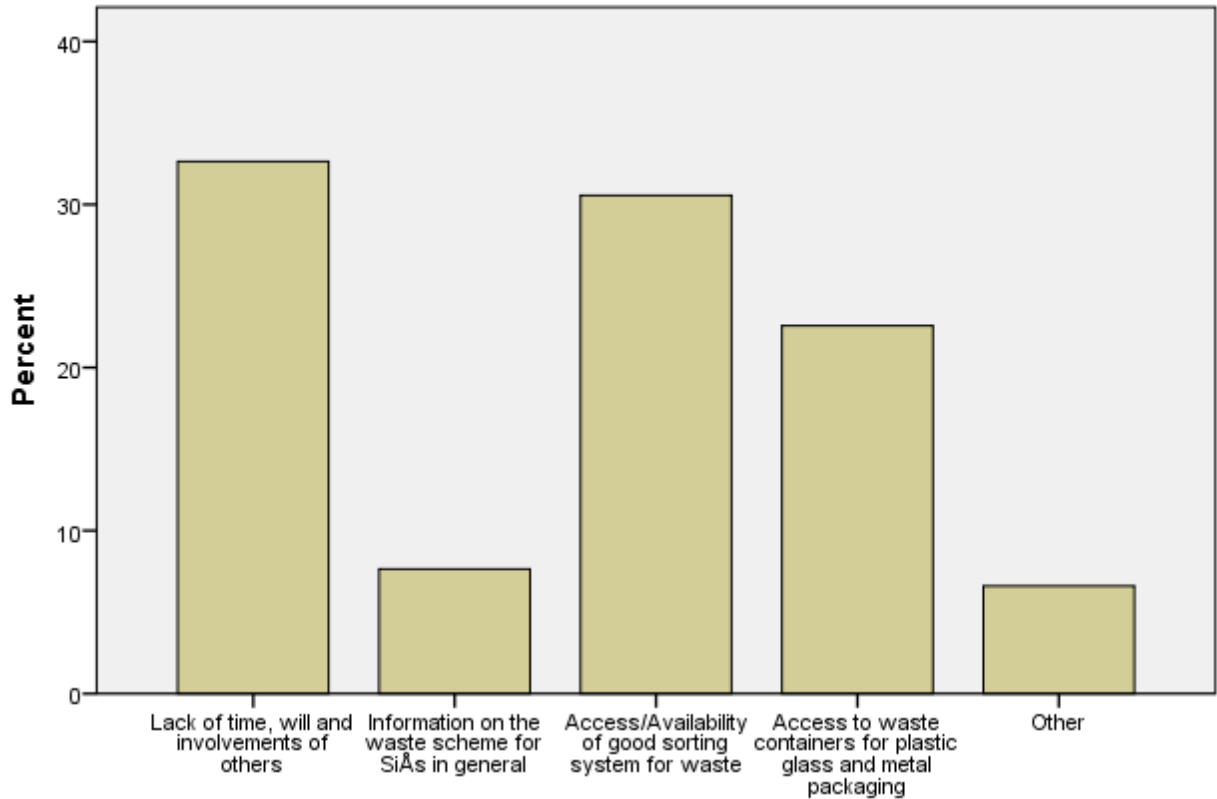
Figure 10: Percentage distribution of perceived barriers from the different barriers proposed.

The figure above shows the response towards the proposed barriers. Initially it was proposed six barriers excluding the option of others. These were later categorized together for further robust analysis. Students report lack of time, will and involvements by others as the biggest barrier among the suggested barriers. The next biggest barrier for students to reach a good waste sorting condition in their dorm is the access or lack of availability of a good sorting system of waste. This indicates also that the students are not satisfied with the sorting system available to them.
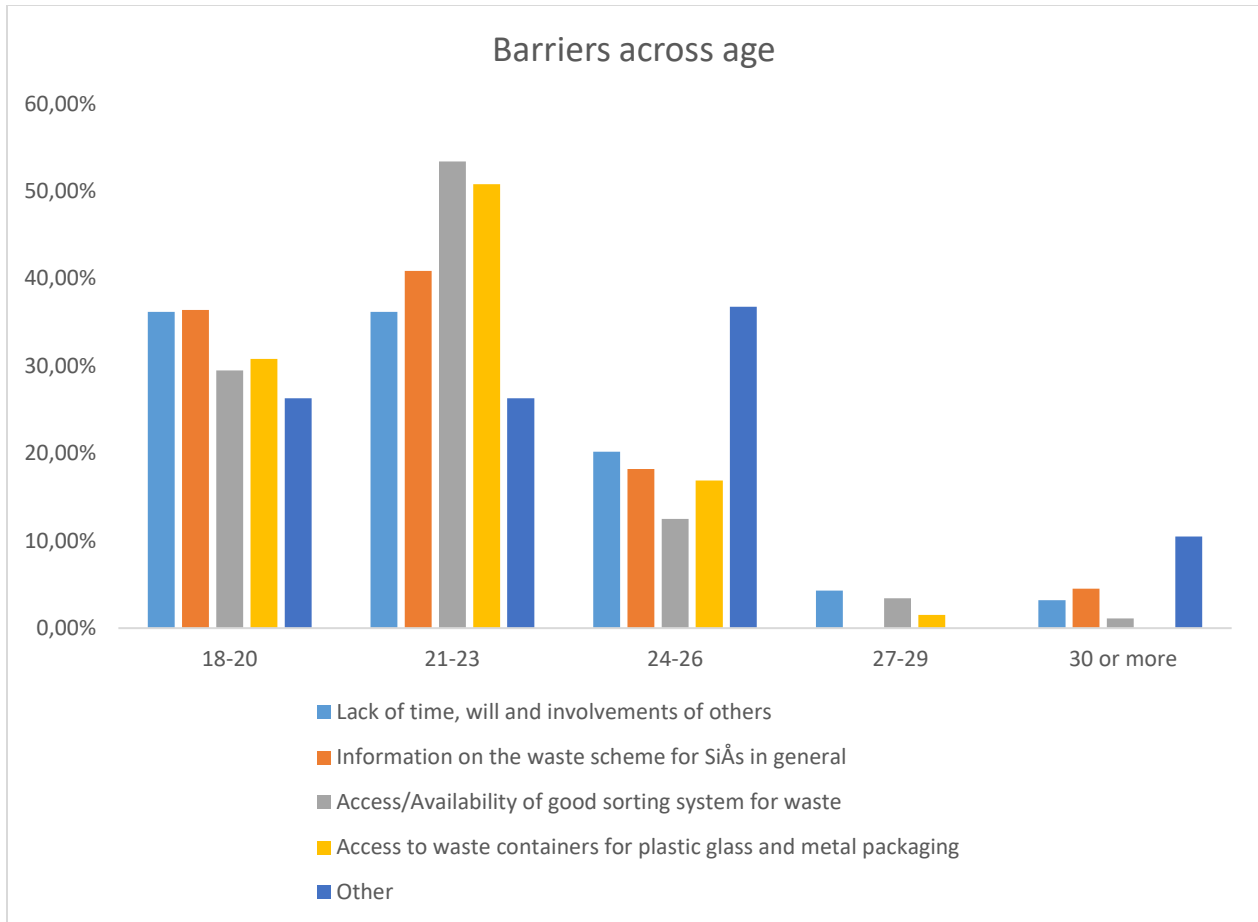
Figure 11: The trends between age and response to barriers among the respondents

There is no evidence about the relation of age and the suggested barriers χ^2= 21,913 and p= 0,146. Figure 11 shows the response between different age groups and within the barriers and percentage of the total between barriers and age.

Table 16: Cross tabulation between worsened waste sorting habits after moving to Ås and the most important barrier that hinders proper waste recycling in the dorm

Worse sorting habits after moving to Ås				Chi- square test				
Most important barrier for waste sorting in dorm	Low (≤2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					34,714	15	0,001	0,209	Min. 0,16. (25,0%)>5
Lack of time, will and involvements of others	50,0%	26,6%	22,3 %	1,1%					

51

Information on the waste scheme for SiÅs in general	27,3%	40,9%	31,8%	0,0%					
Access/Availability of good sorting system for waste	26,1%	29,5%	44,3%	0,0%					
Access to waste containers for plastic glass and metal packaging	30,8%	33,8%	33,8%	1,5%					
Other	73,7%	21,1%	0,0%	5,3%					
Total	32,6%	7,6%	30,6%	22,6%					

The results from the Chi- square analysis show that $\chi^2 = 34,714$ and p=0,001. Therefore, there is evidence to state that there is significant association between negative habits for sorting waste and barriers perceived by the students. Cramer's V = 0,209 which suggest a weak correlation between source sorting behavior across the variables.
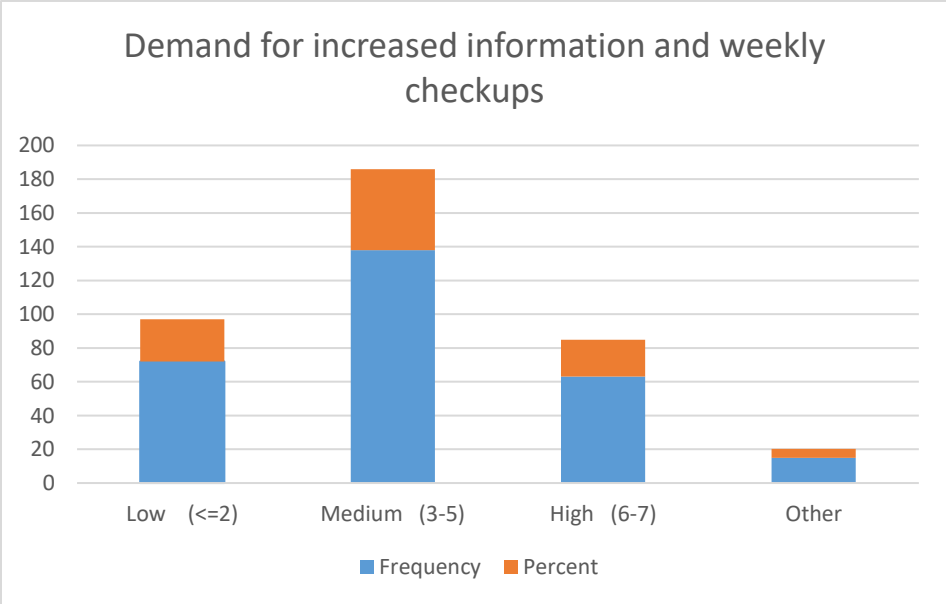
Figure 12: Overview of frequency of demand for increased information and implementation of weekly checkups

The results in the figure show that there is an adequate demand for weekly checkups and increased information to improve the sorting condition in the dorms. The number of students who highly agree that recycling condition could be improved by weekly checkups is lower than the ones who are neutral or has medium interest for the measure.

Table 17: Cross tabulation of difficulty in sorting waste correctly due to lack of proper information and improvement quality of sorting the waste due to better information and weekly checkups.

Lack of proper information makes it difficult to sort the waste correctly					Chi Square test				
Better information and Weekly-checkups	Low (≤2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					54,759	9	0,000	0,252	Min.0,42 (37,5%)<5
Low (≤2)	55,6%	40,3%	1,4%	2,8%					
Medium (3-5)	28,3%	57,2%	11,6%	2,9%					
High (6-7)	14,3%	47,6%	36,5%	1,6%					
Don't know	40,0%	46,7%	6,7%	6,7%					
Total	32,6%	50,3%	14,2%	2,8%					

The results give evidence to reject the null hypothesis. The test gives χ^2= 54,759 and p<0,001. The variable difficulty in sorting waste correctly due to lack of information is dependent on the variable of providing more information of waste recycling and benefit and the weekly checkup. A pairwise z-test post hoc analysis in excel with Bonferroni correction revealed that the ones who disagreed or disbelieved that by having more information and weekly checkup accounted for a significant difference across the range low and high on variable where they responded that lack of proper information was a barrier to sorting the waste in the dorm. The same difference can be observed for those who highly agreed that information and weekly checkup could improve the situation in the dorm. It is those who highly agreed that make the largest significant difference between the percentages of lack of proper information makes it highly difficult to sort waste in the dorm.

Table 18: Cross tabulation and Chi-square analysis between increased info and weekly checkups compared with number of inhabitants (dorm type) the students live with.

Increased info. & Weekly-checkups	Kind of dorm						Chi- square test				
	Single room shared with 3	Single room shared with 5	Single room shared with 7	Single room shared with 15	Couple's apartment	Other	X²	df	p	Cramer's V	Expected count
							25,595	15	0,043	0,172	Min.0,42 (50%)<5
Low (<2)	16,7%	51,4%	2,8%	16,7%	6,9%	5,6%					
Medium (3-5)	12,3%	57,2%	6,5%	18,1%	1,4%	4,3%					
High (6-7)	23,8%	38,1%	3,2%	31,7%	0,0%	3,2%					
Don't know	6,7%	53,3%	0,0%	20,0%	6,7%	13,3%					
Total	15,6%	51,4%	4,5%	20,8%	2,8%	4,9%					

Although the analysis is not robust and the assumptions for the Chi-square test is violated, Chi-square analysis test provides evidence of association between the type of dorm and the demand for increased information and weekly checkups to improve the recycling condition in the dorms. The Chi- square analysis test gives $\chi^2 = 25,595$ and p= 0,043. Hence, the null hypothesis can be rejected. Cramer's V value of 0,172 indicates that the impact of the measure on type of dorm is weak. The analysis is not robust.

Tabell 19: Cross tabulation between increasing information and implementing weekly checkups compared with different socio-psychological variables

Satisfaction to sorting and recycling condition in dorm				Chi Square test				
Increased information and Weekly-checkups	Low (≤2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					16,940	9	0,050	0,140	Min. 0,16 (37,7%)<5
Low (≤2)	15,3%	55,6%	26,4%	2,8%					
Medium (3-5)	11,6%	64,5%	23,2%	0,7%					
High (6-7)	31,7%	47,6%	20,6%	0,0%					
Don't know	20,0%	66,7%	13,3%	0,0%					
Total	17,4%	58,7%	22,9%	1,0%					
	Sufficient knowledge in sorting and recycling own waste								
					7,736	9	0,561	0,095	Min. 1,09 (33,3%)<5
Low (<2)	6,9%	37,5%	36,1%	19,4%					
Medium (3-5)	7,2%	34,1%	36,2%	22,5%					
High (6-7)	9,5%	36,5%	36,5%	17,5%					
Don't know	0,0%	20,0%	33,3%	46,7%					
Total	7,3%	34,7%	36,1%	21,9%					

There is evidence to reject the null hypothesis for the variables satisfaction to recycling condition in the dorm and providing more information of waste recycling and benefit and the weekly checkup. χ^2= 16,940 and p<0,050. Hence, the null hypothesis can be rejected. Cramer's V value 0,140 shows a small size of effect between the variables.

In comparison to that, there is no relationship between having sufficient knowledge and providing more information of waste recycling and benefit and the weekly checkup. Therefore the null hypothesis stands, meaning there is no evidence to infer that having sufficient knowledge depends on the demand for more information of waste recycling and benefit and the weekly checkup.

In the open question there were many suggestions and thoughts regarding the waste sorting conditions in SiÅs. The students were asked to suggest a measure and ways to improve the sorting quality in their dorm and a positive input that could be effective. There were many responses and suggestions. The ones that were most consequent were grouped into following categories:
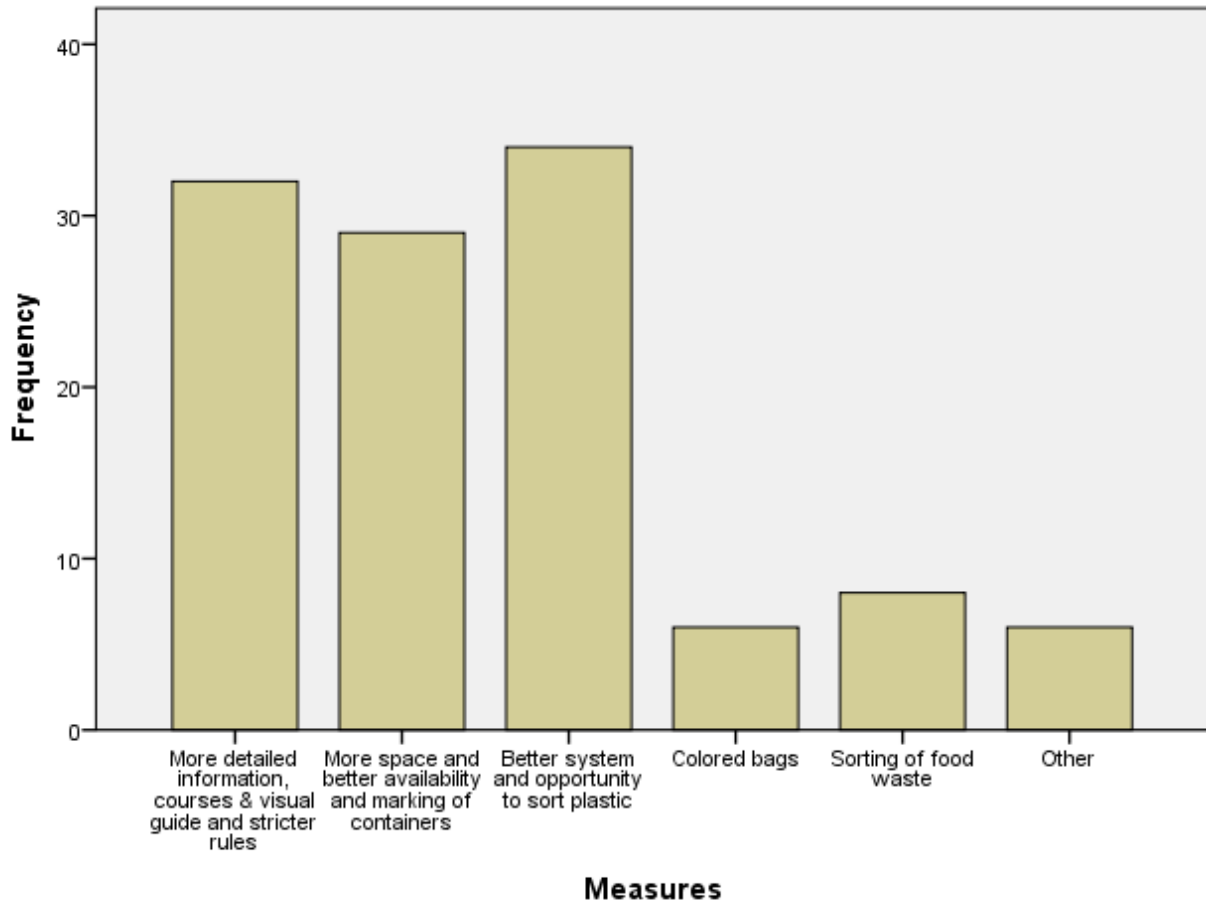
Figure 13: Frequency to response of grouped categories of possible measures.

From the figure it can be observed that from the number of measures suggested from the responses, the measure that is most wanted is better system of the waste recycling and the opportunity to sort waste. It is followed by more detailed information of the benefits of sorting waste and courses, visual guide along with stricter rules of the waste sorting in the dorms.

Among the grouped categories, it is observed that there is a higher demand for a better system and the opportunity to sort plastic waste. The second highest demand among the responses that are given, is the demand for more information and demonstration methods to sort waste along with

having stricter rules and regulations. Although there are a significant amount of responses to the suggestion of measures, it is to be noted that more than half (173 responses) are missing and therefore we cannot say that the conditions for the results to be statistically significant is met. The following figure shows the variation in the responses:

6. Discussion

6.1 Relationships between social demographic and social psychological properties among the students in SiÅs dorms and their source sorting behavior

Gender is observed as a dependent variable when compared with good habits and concern with environmental challenges and proper recycling according to the results from the Chi-square analysis. This is related to the first hypothesis that recycling behavior and attitudes of students at SiÅs are influenced by their experiences from home. More females responded to having developed adequate level or high level of good sorting habits from home. They reported having better sorting habits from home than men. They also felt that source separation results in a higher environmental benefit than the number of men who thoughts so. Females had a higher source sorting behavior with a total of 54,2% with intermediate source sorting behavior while men were lower by 45,8% in the same category This is contradicting to findings by Clay (2005) who found that males were more likely to recycle than females. The findings are similar to findings by Brandt and Miafodzyeva (2013), Robertson and Wallington (2009) and Connell et al. (1998) stated that girls are more environmentally conscious and active and that they reported of being more engaged easily in pro-environmental behavior along with showing a greater willingness to minimize waste.

Age was not a dependent factor in my study. The results from Chi square analysis test for age indicate no significant association between sorting habits of the students and their age. But from the response students from the age group 21-23 report to having best sorting habits from home. This is similar to the results of the research by Werner and Makela who found no relations between demographic variables and recycling behavior. Studies by Vencatasawmy et. al (2000) differs from this discovery, who found that inclination towards higher waste sorting increases with age and increased education level.

From the results it can be noted that students from backgrounds where the waste fractions sorted are low (<=2) responds to having low sorting habits as well. Among the international students that responded to the survey, students from Germany and other countries in Europe report of having high or average sorting habits from home respectively. On the other hand, more students from North America, Asia and Africa respond to having bad sorting habits from home. However, as the international students are underrepresented, the results cannot conclude anything substantial to the waste sorting behavior of students across ethnicity. This may have played a role in the results of the Chi-square analysis as χ^2= 30,336 and p<0,001 hence the evidence supported the rejection of the null hypothesis showing that there is a relation between these two variables. The Chi square analysis for this variable is not at all robust. The high value may be a result of fewer respondents across the international categories. As the difference in number of actual respondents in these categories and the expected count is large, the robustness of the analysis is affected.

Students from municipalities who sorted their waste into 3-5 fraction responded to having very good sorting habits from home. There was an association between waste fractions sorted in home municipality and good habits from home. This indicate that the students are good at recycling their waste from home. Perception of home country having good waste system than that of SiÅs also had an impact on the response to good habits from home. Results also show that there is an association between worsened waste sorting habits after moving to SiÅs and having good habits from home. Of the respondents who had very good habits from home, 37% strongly agreed that their waste sorting habits had worsened after moving to SiÅs. This proves the second part of hypothesis 1a in this research that good practices from home is downgraded after they have moved to SiÅs. Systems that encourage inhabitants to recycle better and is simple and accessible prevents the loss of valuable resources. In order for the strategy to succeed, it is important for both Follo Ren and SiÅs to pay attention why the students report to a worsened sorting habit in the dormitory. It is necessary to maintain an active partnership between the students and the providers of the waste management system (SiÅs and Follo Ren) in order avoid collapse of the system and uphold a positive attitude and engagement towards sorting the waste.

According to Brandt and Miafodzyava's (2013) findings, one of the strongest determinants of recycling behavior intention is seen in the model of socio-psychological group of variables. When

assessing socio psychological factors, the results show concern about environmental challenges and proper recycling can be associated with having good habits from home. My results show that there is a significant relationship between the two variables which supports the hypothesis in 1a. Results from table 6 confirms that family awareness for waste sorting is influential on the developed good habits from home. 73,4% of those who responded to having good habits from home also had families who were conscious towards waste sorting and proper recycling. Brandt and Miafodzyeva (2013) pointed towards uncertainty of variables past behavior and legal norms being dependent or independent variables in the findings of their research. Nevertheless, they do state that family is dynamic unit and can influence the attitude about recycling behavior. Social norms reveal a direct influence on recycling behavior according to Bratt (1999), which significantly also influences children along with partner's behavior towards recycling. By presenting information that seems distant to us, deters the urgency and engagement and risks how individuals respond to various kinds of messages.

6.2 Variations of attitudes and concern for environment among students across study programs, between new students and students that have been studying at NMBU one year or more

There was no relation between the number of years the students had been studying or living in SiÅs and their attitude towards waste sorting. There was however an adequate level of satisfaction towards the existing sorting system at their disposition and 67,4% responded positive towards willingness to put effort into sorting the food waste. This is similar to findings by Robertson and Harrington (2009), who concluded that students who are willing to recycle their waste are also more likely to report higher levels of recycling. In terms of variations of attitude and behavior across faculties, there was no significant relation found between negative or positive attitude towards environment and sorting waste against the faculty of their study area. The hypothesis for 1b is thus not proven.

Below are some examples of typical sorting conditions in the student dorms after implementation of the sorting of organic waste.

Figure 14: Sorted waste in the dorms of SiÅs. Difference in availability of bags for organic waste.

The difference that can be noted here is the mentioned barrier of availability of space, containers and bio-degradable bags. 44,3% (table 16) of those who highly agreed that their waste sorting habits had worsened after moving to SiÅs, felt that the most important barrier was due to lack of access or availability of good sorting system of waste. 25,2% (Figure 10) of those who responded to self-suggested measures wanted to have the opportunity to sort waste better by the provision of more space to have the containers, better availability of bags and marking of the containers. As there are no containers provided by SiÅs for sorting the paper- and cardboard waste and the glass- and metal, the students are left to fend for themselves and organize a system internally. Figure 13 shows the condition of the waste sorting scheme in the typical dorms of pentagon.

Figure 15: A detailed waste sorting system in one of the student dorms of SiÅs included with the guidelines for sorting the waste

Although the students have managed to find solutions to divide the sorting space, there is evidence of the need to have more space to sort the waste into the different categories that is sorted in SiÅs. These are factors suggested as measures and motivating factors by the students in the survey.

6.3 Barriers and motivating measures influencing the students' behavior towards waste sorting

We live in a world dominated by fossil energy and fuels. Those who feels challenged of the consumption and benefitting from this, feel the need to defend their identity and lifestyle against the message of environmental impact of their actions. People prefer information and exhibit a resilient preference of election for information that match the values in their cultural group and reinforces their cultural identity and worldview while dismissing the ones who oppose those (Stoknes, 2015). From the results in 5.2.4 it is noticed that that individuals who highly disagreed with the statement that there is no environmental benefit by sorting and recycling waste , constitutes the largest significance on those who showed willingness (said yes) to put effort on sorting waste after gain of knowledge on benefit of sorting food waste. 20% of the ones who highly agreed with the statement on the other hand, were unwilling to put more effort into sorting their food waste even after acquiring more information. Stoknes (2015) mentions that, people with

conservative values tend to be skeptical on the discussed environmental risks and impacts and tend to dislike the regulations that limit those risks of impacts, as they feel it restrict free choice. He also emphasizes in his work that many conservatives may not oppose the message because they are ignorant, but because it is a way of expressing who they are. He identified this as one of the innermost barrier to climate and environment communications. Introducing and engaging peers and people who are similar to the ones we are trying to get the message across can bring about a shift towards a more positive attitude and higher engagement in waste sorting behavior.

Emphasizing on hypothesis 1c and 1d table 17 proves that there is an association between difficulty in sorting waste correctly due to lack of proper information and the improvement of quality of sorting the waste due to better information and weekly checkups. The results affirm that recycling behavior and attitudes can be improved through more information. This is further supported by the results from the response to the question of willingness to put more effort into sorting waste after gain on knowledge of benefit of sorting the food waste. 67,4% of the respondents replied positive on increased willingness and motivation.

The results from the table 14 which compares skepticism towards environmental benefit of sorting waste and the variable increasing information and weekly checkups in the dorms, prove the hypothesis 1 c and 1d. The results demonstrate that recycling attitude can be influenced by providing more information on benefit of sorting waste and how to sort the waste in the dorms while also implementing weekly checkups.

Through the words of Stoknes (2015), it is understood that in order to avoid rationalizing our actions due to our own social standings, it is important to find communicators and a way of communication whose cultural identities are consistent with the audience. Psychotherapy reveals that deep personal change doesn't happen easily (Stoknes, 2015). Simply sending more facts and forecasts wrapped in fancy campaign materials in the direction of the public is not an effective form of communication. In order to develop a sustainable and efficient system it is recommended that SiÅs focus towards channeling the message by student representatives. We tend to build resistance towards anything that hampers our thoughts and beliefs. Perhaps it is therefore important to emphasize on the specifics and conditions of the individual and try to understand the defense barriers that keep the message away. In such a diverse population, it is challenging to develop and initiate measures that achieve effective goals. Stoknes (2015) mentions five main strategies for

solutions that can be helpful and they are i) Social ii) Supportive iii) Simple iv) Story based and iv) Signals. The measures suggested by the students is an introductory focal point for further development and organization of the sorting system in the dorms.

The results in table 9 shows that the influence of cohabitants or dorm mates is significant among those who responds to having improved waste sorting habits after moving to SiÅs. As peers and neighbors evidently are able to affect our attitudes and how we act, favorable results could be achieved by informing people of what others do, especially in their networks of friends. Stoknes (2015) supports this by stating that most of us tend to act according to what we believe similar others do. These actions can lead to growth of the impact of the request. By promoting cleaner areas and proper recycling in the dorms through checkups, there is a potential to achieve higher efficiency. Those with bad or poor habits might be propelled to develop a better-organized and environmental friendly conducts by seeing their peers and fellow dorm mates engaged towards such a cause. Regulations help the attitude, as people tend to adjust their behavior to fit the signals sent by their physical surroundings about what a neighborhood finds acceptable (Stoknes, 2015).

By presenting results that are positive, simple and relatable, progressive social norms may be reinforced among the students. This idea is also supported by Stoknes (2015) who states that shaming messages backfire, while positive messages boost progressive social norms. Introducing some sort of competition and idea of gain, could lead to a change in sorting behavior among the students. A good cause can be associated with getting acknowledgement and status among the nearest relatable group, the issue or task would feel near and personal instead of something distant and therefore result in a positive outcome. Stoknes (2015) offers a similar view in his research.

6.4 How robust are the results

The data set is based on self-produced survey conducted among students of SiÅs dorms Pentagon 1 and 2, Ponoma and Palisaden where the student population of living under SiÅs are the largest. The survey was distributed by email through questback. It was taken in mid-October to avoid informal fall break and implementation of the introduction of organic source sorting system in all the houses the survey was conducted. The low response rate could be due to a lack of interest among students towards recycling survey or that they might simply have missed to check their e-mail folders. Some e-mails do tend to be delivered in the junk mail folder as well as the fact that

not everybody checks their mail regularly. There is also a possibility that the e-mail address given to SiÅs might not have been the students primary e-mail. The size of the data set makes it possible to transfer the results to compare it with the entire student population in SiÅs. For the groups ethnicity and faculty, the response in the questionnaire is underrepresented, and thus these results are not necessarily transferable to the rest of the population. There is also a chance that the questions may have been misunderstood and therefore some inconsistency may have occurred and thus affected the outcomes.

For the analysis of the dataset cross tabulation with Chi- square analysis has been used. Chi-square analysis is the most popular non-parametric or distribution free tests and it is the default choice when analyzing applied psychological categorical data. It is an important and useful method for seeking to evaluate categorical data (Sharpe, 2015). A multiple analysis on the similar dependent variable may lead to increased chance to commit a type I error, therefore also leading to increasing the likelihood of getting a favorable result by chance. A measure to avoid Type I error was to conduct a Bonferroni correction. This test can protect from type I error but does leave the risk of failing to reject the null hypothesis when it should be rejected i.e. a type II error. The importance of residuals is mentioned in 5.1, but it is also important to highlight that the largest expected values also produces the largest raw residuals (Sharpe, 2015). To ensure a more robust interpretation, Pearson residual or adjusted residual was calculated in SPSS.

A certain number of responses had responded "others" or "I don't know" which caused discrepancy in the results of the analysis as there was big differences in the expected and counted values in the column. A measure to avoid such errors in future research could be to eliminate this option in variables that are of special interest.

6.5 Further research and practical use of the results

The results of the research demonstrate that significant demographic and socio-psychological variables contribute to recycling behavior and attitude towards sorting waste and the environment. From the results it is highlighted that the importance of understanding of procedures of sorting waste, routine checkups and the level of information provided to the students are influential factors for students and their sorting behavior and attitude. For further research and understanding of the condition, new statistical analysis on a larger student population can be performed in order to investigate how the students acknowledge and operate around the new sorting system after getting

habituated with the changes. For a more in depth research particular investigations towards just the new students between the age group 18-22 and their practices, attitudes and their adjustment to the sorting system might be of interest. The age group 18-24 is particularly interesting because younger students tend to take time to adjust and be habituated with the new circumstances living without family and parental supervision or direction. When new at university, sorting waste properly might prove difficult and one can easily become oblivious to ones actions and impact if these are not addressed. The importance of understanding actions that drive environmental concern and result to higher sorting degree of waste among students is also a key focus point for further investigation.

A thought provoking idea for further research is to investigate the population of international students residing in SiÅs dorms and compare their practices and perceptions of waste sorting and waste management to the practices and attitudes of ethnic Norwegian students. NMBU is an international institution and their research and study programs bring people from all over the world to Ås and SiÅs is often the most preferred place of residence due to accessibility and convenience in both social and geographical terms. The findings can be useful for raising awareness between both groups, but especially among the international students. An increased interest and attitude towards proper waste sorting among international students could affect the overall efficiency in material recovery for household waste.

6.5.1 Recommended actions for SiÅs and Follo Ren

Apart from the evaluations and suggestions in the previous chapters, I would recommend a few more actions that are possible in order to bring change in the sorting behavior. From the responses of the survey, it is apparent that there is a higher demand for a better system along with desire to have the opportunity to sort plastic among the students. The desire was also expressed during personal interactions with the students when taking photographs of their recycling system. The awareness of the need to sort plastic waste might be strong among the students, but their comments make it apparent that they have not received sufficient information. Steps to reduce the gap between the knowledge of the regulations and sorting system should be evaluated and initiated promptly, so that students do not lose conviction of the benefits of sorting their waste. While conducting the research it is brought to attention that SiÅs's main method of contacting and staying

in touch with the students is through e-mail. As the impact of social networks are growing and students tend to use social networking sites such as Facebook and Instragram frequently, SiÅs could consider being active and informative on their Facebook page and other networking sites. Personal experience and interactions with students show that information is not easily accessible in SiÅs website. I will suggest that SiÅs presents the information for the waste sorting system so that it is easily found, perhaps an option on the front page. This could help in increasing knowledge, therefore initiate a positive attitude towards the waste sorting system available in SiÅs, and help increase material recovery. Stoknes (2015) mentions that social networks play a vital role in strengthening the norms to care. With the assistance of different student unions in NMBU such as the university student paper Tuntreet or Spire Ås more information could be spread and also initiate higher awareness and student engagement.

Some dorms (Løa) have not received the option to sort their organic waste. Attention to deviations and a system to follow up missed accommodations needs to be developed in order to hinder valuable resources going lost in the residual waste.

To implement the waste sorting scheme better and achieve a higher degree of waste sorting among student households, a research investigating the implementation of different measures that are suggested in the study might be of interest. Research could be conducted to evaluate the effects of use of visual guiding techniques such as easily accessible videos, implementation of smart boards across the campus and the dorms. They could display the information and summarize short benefits and consequences of the waste that is being recycled. This might awaken interest and lead to positive attitude and development of better habits for sorting waste. Another trial measure could be to see the effects of recycling in the dorms if the 'carrot-and whip method' was implemented. By enforcing a fee or a form of punishment for households whose waste is not sorted well, could be motivator. On the other hand, one could encourage good waste sorting habits by implementing promotional campaigns for waste minimizations and small monthly prizes for households with good conditions after monthly or weekly check. One could also engage students from different backgrounds and faculties for promoting waste minimization, by including and encouraging students who might not be aware about the sorting and recycling situation. Seeing own peers and familiar faces engaging in the cause might motivate more students of different backgrounds to be

more aware of their actions. This could improve the waste situation in the student dorms while also obtain a higher quality of the waste sorted.

Developing policies and expecting people to adapt without explanation and demonstration is not beneficial in the long term. Following the five strategies mentioned by Stoknes (2015), Follo Ren could also engage in providing information and encouragement through social mediums, be supportive of the actions taken by providing examples of good results (if any available) in the student society. The message and information needs to be short, simple, and something relatable for the students. Students are generally interested and inquisitive. It is therefore advisable to take this curiosity and develop positive engagement in the student society by applying tools and measures that may benefit the degree of waste sorted.

7. Conclusion

The main purpose of the research was to increase knowledge and identity patterns regarding student behavior of and attitude towards waste and recycling conditions in SiÅs. The aim of this study was to give an overview of the different factors that affect recycling attitude and habits of the students in SiÅs. The research also looked towards measures that may help to improve these habits and attitudes in order to gain a better degree of sorted waste. The results from the survey analysis provide interesting discoveries that will be useful for future steps of implementing new measures and routines. The results of the analysis indicate that there are several socio-psychological variables along with socio-demographic variables that influence waste sorting behavior and attitude.

The waste sorting behavior for the student dorms are based on self-reported traits. The responses express that most of them are positive towards their own sorting habits and have sufficient knowledge on sorting their waste. Family background, their awareness and dedication towards waste sorting is found to be an important variable when determining the good habits of the students from home. In my study, I found no association between age and the different socio-psychological variables. Nevertheless, the age group 21-23 are the ones who reports very good habits of sorting waste from home and positive attitude towards environment and co-habitants.

Education and information are also observed as crucial variables influencing waste sorting attitude and habits. Results from analysis show that those who report lack of information hinders proper sorting of waste in the dorms, responds positively towards the availability of more information and implementation of regulations such as- weekly checkups of the sorted waste. SiÅs should consider stimulating increased engagement of sorting the waste through strict requirements and providing more knowledge as a measure to improve the quality of sorting. Such possible measures are, according to my results, very positive among the student households.

The positive influence of co-habitants is also observed among the students. Those who report that their waste sorting behavior has improved adequately after moving to SiÅs, state that their cohabitants have greatly encouraged them to be environmentally conscious. Thus, instead of

heaping full weight of environmental disruption on an individual alone, we can engage the power of social networks to strengthen the norms to care. Being appreciated by others for their environmentally conscious efforts is more motivating than just saving and conserving all by oneself.

Focusing on developing to eliminate the barriers that the students find most problematic is a necessary action. If Follo Ren wishes to encourage student recycling and achieve a higher degree of material recovery in student households, implementing campaigns and dedication towards removing the barriers in the student dorms is imperative. Among the measures that could be undertaken is the improvement of quality and accessibility to discard the waste. The measure that was frequently suggested by the students is the possibility to sort plastic waste. This shows a knowledge gap between the circumstances and the information provided as plastic waste is not sorted in the municipality anymore. Results show, creating an awareness around the measures that are being taken and how they are contributing to benefit for the environment is necessary in elevating student interest and developing better attitude towards sorting.

The research confirms that environmental concern and behavioral experience correlate with recycling habits; it is therefore important for future development in the field to cultivate resources to remove the gap between knowledge and participation. There are many considerations that must be taken in to account as the diversity in the population challenges the development of measures and instruments that can achieve an effective goal. By using the five strategies mentioned by Stoknes (2015) there is a scope and potential to increase motivation towards waste sorting and recycling. Rephrasing the words of Barrack Obama, progress is not a smooth path. It comes in fits and starts. We are the change we seek (Gould and Harrington, 2017). Every individual has the potential to make a difference. It is therefore important to focus on educating and mediating discipline of our actions towards the environment in a positive manner. To avoid the loss of valuable resources which occurs by the wrong management of waste it is crucial to encourage and focus on continuously updating the students on waste management's practices and regulations in their dorms.

8. List of reference

Ajzen, I.,(1991). *The theory of planned behavior. Organizational Behavior and Human Decision Processes* 50, 179–211.

Armijo de Vega C, Ojeda-Benitez, S.,Ramirez-Barreto, M.E., (2003). Mexican educational institutions and waste management programmes: a University case study Resources, Conservation and Recycling 39: 23-29

Avfall Norge. (2017). *Stort gjennomslag i regjeringens strategi for grønn konkurransekraft*. Available from: https://www.avfallnorge.no/bransjen/nyheter/stort-gjennomslag-i-regjeringens-strategi-for-gr%C3%B8nn-konkurransekraft Accessed: 25.10.2017

Barr, S., Ford, N.J., and Gilg, A.W.(2003). *Attitudes towards recycling household waste in Exeter, Devon: quantitative and qualitative approaches.* Local Environment, 8 (4), 407–421.

Bleikelia M. (2013). *Vi produserer mer søppel og resirkulerer mindre*. Aftenposten, Oslo. Available at: https://www.aftenposten.no/norge/i/506Mm/Vi-produserer-mer-soppel-og-resirkulerer-mindre
Accessed: 04.10.2017

Bratt, C.(1999). The impact of norms and assumed consequences on recycling behavior. *Environment and behavior*, 1999 Sage Publications, Inc..Vol. 31 No. 5, *September 1999 pp.630-656*

Boduszek, D. (2013). Chi-square test and McNemar tests in SPSS. Department of sociology:University of Oxford. Available from: https://www.sociology.ox.ac.uk/qm-archive/chi-square-and-mcnemar-tests-in-spss.html Accessed: 20.11.2017

Bruvoll, A., Halvoesen, B., Nyborg, K. (2000). Household sorting of waste at source. J. Econom. Surv. 4, 26–35

Cohen, J. (1988). *Statistical power and analysis for the behavioral sciences (2nd ed.)*, Hillsdale, N.J., Lawrence Erlbaum Associates, Inc.

Collins, A., O'Doherty, R., and Snell, M.C. (2006). *Household participation in waste recycling: some national survey evidence from Scotland*. Journal of Environmental Planning and Management, 49 (1), p .121–140.

Connelly, L.M., 2016. *Fisher's exact test*. MedSurg Nursing, 25(1), pp.58-60.

Clay, S. (2005). *Increasing university recycling: Factors influencing recycling behaviour among students at Leeds University.* Earth and Environment, 1, pp.186-228.

European Environment Agency. (2015). *Waste*. Available at: https://www.eea.europa.eu/soer-2015/europe/waste Accessed: 02.11.2017

European Commission. (2014). *Towards a circular economy: A zero waste programme for Europe. Brussels*. pp. 14

European Environmental Agency. (2012). *Consumption and the environment — 2012 update, European Environment Agency.* Available from: https://www.eea.europa.eu/publications/consumption-and-the-environment-2012 Accessed: 25.09.2017

European Union. (2008). *Directive 2008/98/EC Article 3 of the European Parliament and the Council of 19 November 2008 on Waste and Repealing Certain Directives*. Official Journal of the European Union, 22/11/2008. Available at: http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32008L0098 Accessed: 05.09.2017

Falkenberg, K. (2012).*Guidelines on the interpretation of key provisions of Directive 2008/98/EC on waste.* European Commission Directorate general. Available from: ec.europa.eu/environment/waste/framework/pdf/guidance_doc.pdf   Accessed: 02.10.2017

Follo Ren. (2017). *Møteprotokoll- Representantskapet i Follo Ren IKS*. Available at: http://www.folloren.no/getfile.php/3940868.1195.svpwxruaeb/moteprotokoll-representantskapsmote-18.04.2016.pdf Accessed: 17.10.2017

Follo Ren. *Ofte stilte spørsmål*. Available from: http://www.folloren.no/ofte-stilte-spoersmaal.428166.no.html Accessed: 30.10.2017

Fredriksen, H.H. (2016). *EØS-avtalen*. Oslo: Store norske leksikon. Available from: https://snl.no/E%C3%98S Accessed: 21.09.2017

Gould,S., Harrington, R. (2017). *17 of President Obama's most inspirational quotes.* Bussiness insider. Available at: http://www.businessinsider.com/obama-quotes-inspirational-best-speeches-2017-1?r=US&IR=T&IR=T/#-1 Accessed: 02.12.2017

Gregson, N., Mecalfe, A. and Creww, L. (2007). *Indentity, mobility and the throwaway society*. Environment and Planning D: Society and Space. pp. 682-700

Grennes T. (2001). *Innføring i vitenskapsteori og metode. 2 utg*. Universitetsforlaget. pp.102-103, 106-107, 142, 166

Hagen, O., Soderholm, P. (2007). *An econometric analysis of regional differences in household waste collection: the case of plastic packaging waste in Sweden.* Waste Management. 28, p. 1720–1731

Hage, O., Söderholm, P., Berglund, Ch. (2008). *Norms and economic motivation in household recycling: evidence from Sweden.* Resoure. Conserve. Recycle. pp. 155–165

Halvorsen, B. (2012). *Effects on norms and policy incentives on household recycling: An international comparison.* Science direct: Resources, convention and recycling, 67: pp. 18-26.

Herremans I, Allwright DE.(2000). *Environmental management systems at North American Universities: what drives good performance?* Association of University Leaders.
for a Sustainable Future (ULSF). p. 3.

Hornik, J., Cherian, J., Madansky, M., Narayana, Ch.(1995). *Determinants of recycling behaviour: a synthesis of research result*s. J. Socio-Econ. 24(1), pp. 105–127.

Lyng, K.-A. og Modahl, I.S. (2011): *Livsløpsanalyse for gjenvinning av plastemballasje fra norske husholdninger (LCA of recycling of plastic waste from Norwegian households).* Østfoldforskning AS.

MacArthur, E. (2013). *Towards the circular economy.* Journal of Industrial Ecology.

Malmo, L.L. (2013). *Hva skjer med avfallet du leverer?*. ROAF. Available at: http://www.roaf.no/hva-skjer-med-avfallet.299759.no.html Last seen: 14.11.2017

Michael, S.R. Crosstabulation and Chi Square. Available from: http://www.indiana.edu/~educy520/sec6342/week_10/chi_sq_summary011020.pdf Accessed: 03.12.2017

Miljødirektoratet. (2014). *Vi kaster mer.* Available from: http://www.miljodirektoratet.no/no/Nyheter/Nyheter/2014/Juni-2014/Vi-kaster-mer/ Accessed: 05.09.2017

Miljøverndepartementet. (2013). *Avfallsstrategi: Fra avfall til ressurs*. Oslo: Miljøvern Departementet

Morgan, F. & Hughes, M. (2006). *Understanding recycling behavior in kentucky: who recycles and why*. Global recycling: 32-35.

Murphy, K.R., and Myors, B. (1998). *Statistical power analysis—A simple and general model for traditional and modern hypothesis tests*: Mahwah, N.J., Lawrence Erlbaum Associates, Inc.

Nye, M. and Burgess, J. (2008). *Promoting durable change in household waste and energy use behaviour: a research report for DEFRA*. Norwich, UK: University of East Anglia, Available from: www.coolcitychallenge.org/s/PROMOTING_DURABLE_CHANGE-g3f8.pdf Accessed. 06.11.2017

Opheim, O.I. (2011). *Endringer av renovasjon i Ås*. Ås kommune. Available from: http://www.as.kommune.no/endringer-av-renovasjon-i-as.4909489-125470.html Accessed: 26.08.2017

Pakpour, A.H., Zeidi, I.M., Emamjomeh, M.M., Asefzadeh, S. and Pearson, H.,(2014). *Household waste behaviours among a community sample in Iran: an application of the theory of planned behaviour*. Waste management, 34(6). pp. 980-986

Stoknes, P. E. (2015). *What we think about when we try not to think about global warming : toward a new psychology of climate action*. White River Junction: Chelsea Green Publishing.. pp. 290

Pilot. D.F., Beck C.T. & Hungler. B.P. (2001). *Essentials of Nursing Research: Methods, Appraisal and Utilization.* 5th Edition, Lippincott. Williams &Wilkins, Philadelphia.

Regjeringen.no, (2017). *Regjeringen legger frem strategi for grønn konkurransekraft.* Avaialable at: https://www.regjeringen.no/no/aktuelt/strategi-for-gronn-konkurransekraft/id2575358/ Accessed: 27.10.2017

Robertson, S., Walkington, H. (2009). *Recycling and waste minimisation behaviours of the transient student population in Oxford: results of an on-line survey, Local Environment*, 14:4, 285-296, Available at: http://dx.doi.org/10.1080/13549830902812982 Accessed: 03.09.2017

Sharpe, D.(2015). Your chi-square test is statistically significant: Now what?. *Practical Assessment, Research & Evaluation*, *20*.

Simonsen, M.H.(2017). Renovasjonsløsninger Follo Ren. Mail

SiÅs.(2017). *Practical info- Garbage*. Available from: http://www.sias.no/english/housing/student_residences/sias_student_residences/practical_info/rubbish.html Accessed: 11.11.2017

SiÅs (2017). *Background*. Available from: http://www.sias.no/bakgrunn_historikk.html Accessed: 14.09.2017

Schaeffer, N.C., Dykema, J., Elver, K., Stevenson, J., Thayer-Hart, N. (2010). *Survey fundamentals A guide to designing and implementing surveys*. University of Wisconsin System

Board of Regents. Available from:
https://oqi.wisc.edu/resourcelibrary/uploads/resources/Survey_Guide.pdf

Schultz PW, Oskamp, S., Mainieri, T. (1995). *Who recycles and when? A review of personal and situational factors.* Journal of Environmental Psychology 15: 105-121

USGS (2017). Statistical Interpretation. Fort Collins Science Center. Avaialble from:
https://www.fort.usgs.gov/sites/landsat-imagery-unique-resource/statistical-interpretation
Accessed: 29.11.2017

USGS (2017). Statistical Interpretation. Fort Collins Science Center. Avaialble from:
https://www.fort.usgs.gov/sites/landsat-imagery-unique-resource/statistical-interpretation (Cited after Murphy, K.R., and Myors, B. (1998). *Statistical power analysis—A simple and general model for traditional and modern hypothesis tests*) Accessed: 29.11.2017

Wirtz, J. (1994). *Consumer Satisfaction With Services: Integrating Recent Perspectives in Services Marketing With the Traditional Satisfaction Model in AP* - Asia Pacific Advances in Consumer Research Volume 1, eds. Joseph A. Cote and Siew Meng Leong, Provo, UT : Association for Consumer Research. Pp. 153-159

Williams, I.D. and Gunton, H. (2007). *Sustainable lifestyles for young people: a case study for university students*, Eleventh International Waste Management and Landfill Symposium, S. Margherita di Pula, Cagliari, Sardinia, Italy, 1/5 October, Paper No. 146.

Walther-Zhang, Y. (2014). *Effekten virkemidler har for kildesortering av småelektronisk avfall: en kvantitativ undersøkelse*. pp. 62.

Appendix

Background questions

1. Gender

Options: Male   Female

2. What is your age?

Options: 18-20   21-23   24-26   27-29   30 or more

3. For how many years have you been a student at higher level (university/university college)?

Options: <1   1   2   3   4   5 or more

4. How many years have you studied in NMBU?

Options: <1   1   2   3   4   5 or more

5. At what faculty do you study?

Options: BIOVIT   HH   KBM   MINA   LANDSAM   REALTEK   VET

6. Which municipality is your family home address?

Answer:

7. How many members did you live with at your family home address?

Answer:

8. What kind of dwelling did you live in at your last address before moving to SiÅs dorms?

Options: Student house   Couple's apartment   Single apartment   With parents /and siblings
With family and kids   With friends

9. What kind of waste fractions were sorted in your family home situation? Choose the one/ones that are applicable to your home waste sorting system.

Options: Organic waste   Cardboard and paper waste   Plastic waste   Hazardous waste and electrical waste   Glass and Metal   Residual waste   N/A

10. In which municipality did you live in before you started studying in NMBU?

Answer:

11.Have you lived in a student dorm outside of SiÅs?

Options: Yes   No

12. If yes, for how long did you live there and where?

Options: 1   2   3   4   5 or more   N/A

Where:

13. In which student dorm do you live in at present?

Options: Pentagon 1   Pentagon 2   Pallisaden   Ponoma   Other

14. What kind of dorm is your student dorm?

Options: Single room shared with 3   Single room shared with 5   Single room shared with 7 Single room shared with 15   Couple's apartment Other

15. For how long have you lived in SiÅs housings?

Options: <1   1   2   3   4   5 or more years   N/A

From a scale to 1 to 7 to what degree do you agree with the following statement from 1 strongly disagree to 7 strongly agree and 4 is neutral. N/A not applicable or if you don't know.

16. I am concerned with environmental challenges and proper recycling of waste

Answer scale: 1   2   3   4   5   6   7   N/A

17. I have sufficient knowledge in sorting and recycling my waste

Answer scale: 1   2   3   4   5   6   7   N/A

18. I have developed good waste sorting and recycling habits from home

Answer scale: 1   2   3   4   5   6   7   N/A

19. My family at home has always been conscious and careful about sorting waste

Answer scale: 1   2   3   4   5   6   7   N/A

20. I am well aware of and have good knowledge about the current sorting system in my dorm

Answer scale: 1   2   3   4   5   6   7   N/A

21. I am satisfied with how my cohabitants sort and recycle their waste in our dorm

Answer scale: 1   2   3   4   5   6   7   N/A

22. The sorting and recycle system in my home county is far better than that of my current housing.

Answer scale: 1   2   3   4   5   6   7   N/A

23. My cohabitants inspires me to be more environmentally conscious

Answer scale: 1   2   3   4   5   6   7   N/A

24. My waste sorting and recycling habits has improved after moving to Ås, compared to my former living situation

Answer scale: 1   2   3   4   5   6   7   N/A

25. Lack of proper information on how to sort and recycle the waste in my dorm makes it difficult to sort the waste correctly

Answer scale: 1   2   3   4   5   6   7   N/A

26. My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation.

Answer scale: 1   2   3   4   5   6   7   N/A

27. Before I started studying in NMBU I was not aware of the different categories of sorting waste

Answer scale: 1   2   3   4   5   6   7   N/A

28. I do not find that waste sorting and recycling is very beneficial for the environment as claimed.

Answer scale: 1   2   3   4   5   6   7   N/A

29. By having more and better information and weekly check-ups the quality of sorting the waste in my dorm could be improved

Answer scale: 1   2   3   4   5   6   7   N/A

From a scale of 1 to 7 where 1 is very bad and 7 is very good how would you describe the following statements?

30. How beneficial would general cleanliness of the dorm be for better sorting habits of waste in your dorm?

Answer scale: 1   2   3   4   5   6   7   N/A

31. How well do you know how waste is sorted and utilized to make other products?

Answer scale: 1   2   3   4   5   6   7   N/A

32. What are the environmental benefits by sorting and recycling your waste?

Answer scale: 1   2   3   4   5   6   7   N/A

33. How satisfied are you with the current sorting and recycling condition in your accommodation?

Answer scale: 1   2   3   4   5   6   7   N/A

34. If you are living in dorm with a new waste sorting system, how satisfied are you in overall with this new sorting system?

At last, are the following statements right or wrong?

35. Food waste can be used to produce biogas?

Options: Right Wrong   N/A

36. Most of the Ruter's buses run on biogas?.

Options: Right Wrong   N/A

37. Food waste can be used to produce plant fertilizer?

Options: Right Wrong   N/A

38. Knowing the benefits of sorting your food waste, would you be willing to put more effort into sorting your waste in your dorm/would that increase your motivation for sorting your waste properly?

Options: Yes   No   Maybe   N/A

39. What do you consider becomes of your plastic waste?

 i) Recycled plastic products ii) Energy recovery iii) Deposited

Options:
Only i)
Only ii)
Only iii)
i) and ii)

40. What condition do you regard as the most important barrier for waste sorting in your dorm (select only one)?

Options: Lack of will   Lack of time   Information on the waste scheme for SiÅs in general
Access/Availability of good sorting system for waste   Lack of involvements by other students
Access to waste containers for plastic glass and metal packaging   Other   N/A

41. What could have been done to improve how waste is sorted and recycled in your dorm?

Answer:

42. What positive input would

Answer:

Appendix 2

Table 18: Descriptive analysis of different variables

	N	Minimum	Maximum	Mean	Std. Deviation	Variance	Minimum
Descriptive analysis of different variables							
I have developed good waste sorting and recycling habits from home	288	1	3	2,61	0,579	0,335	1
How well do you know how waste is sorted and utilized to make other products?	288	1	4	2,11	0,571	0,326	1
I am well aware of and have good knowledge about the current sorting system in my dorm	288	1	4	2,70	0,530	0,281	1
I am concerned with environmental challenges and proper recycling of waste	288	1	4	2,70	0,530	0,281	1
How satisfied are you with the current sorting and recycling condition in your accommodation?	288	1	4	2,08	0,663	0,440	1
I am concerned with environmental challenges and proper recycling of waste	288	1	4	2,70	0,530	0,281	1
I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed	287	1	4	1,33	0,694	0,481	1
Food waste can be used to produce biogas?	288	1	3	1,08	0,383	0,146	1
What condition do you regard as the most important barrier for waste sorting in your dorm (select only one)?	288	1	8	4,00	1,941	3,767	1
By having more and better information and weekly check-ups the quality of sorting the waste in my dorm could be improved	288	1	4	2,07	0,821	0,674	1

Appendix 3

Table 19: Cross tabulation between good habits from home and family consciousness and carefulness of sorting waste

I have developed good waste sorting and recycling habits from home (Binned) * My family at home has always been conscious and careful about sorting waste (Binned) Crosstabulation						
			My family at home has always been conscious and careful about sorting waste (Binned)			
			Low (<= 2)	Medium (3 - 5)	High (6 - 7)	Total
I have developed good waste sorting and recycling habits from home (Binned)	Low <=2	Count	13	1	0	14
		Expected Count	1,3	4,9	7,8	14,0
		% within I have developed good waste sorting and recycling habits from home (Binned)	92,9%	7,1%	0,0%	100,0%
		% of Total	4,5%	0,3%	0,0%	4,9%
		Residual	11,7	-3,9	-7,8	
	Medium 3-5	Count	9	52	22	83
		Expected Count	7,5	29,2	46,3	83,0
		% within I have developed good waste sorting and recycling habits from home (Binned)	10,8%	62,7%	26,5%	100,0%
		% of Total	3,1%	18,1%	7,7%	28,9%
		Residual	1,5	22,8	-24,3	
	High 6-7	Count	3	47	138	188
		Expected Count	17,0	66,2	104,8	188,0
		% within I have developed good waste sorting and recycling habits from home (Binned)	1,6%	25,0%	73,4%	100,0%
		% of Total	1,0%	16,4%	48,1%	65,5%
		Residual	-14,0	-19,2	33,2	
	Other	Count	1	1	0	2
		Expected Count	0,2	0,7	1,1	2,0
		% within I have developed good waste sorting and recycling habits from home (Binned)	50,0%	50,0%	0,0%	100,0%
		% of Total	0,3%	0,3%	0,0%	0,7%
		Residual	0,8	0,3	-1,1	
Total		Count	26	101	160	287
		Expected Count	26,0	101,0	160,0	287,0
		% within I have developed good waste sorting and recycling habits from home (Binned)	9,1%	35,2%	55,7%	100,0%
		% of Total	9,1%	35,2%	55,7%	100,0%

Appendix 4

Table 20: Cross tabulation and chi square test between family consciousness and carefulness of sorting waste and negative attitude towards the benefit of sorting waste

My family at home has always been conscious and careful about sorting waste (Binned) * I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned) Crosstabulation

			I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned)				Total
			Low (<= 2)	Medium (3 - 5)	High (6 - 7)	Other	
My family at home has always been conscious and careful about sorting waste (Binned)	Low (<= 2)	Count	17	4	4	1	26
		Expected Count	19,9	4,4	0,9	0,8	26,0
		% within I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned)	7,8%	8,3%	40,0%	11,1%	9,1%
		% of Total	5,9%	1,4%	1,4%	0,3%	9,1%
	Medium (3 - 5)	Count	78	15	3	4	100
		Expected Count	76,6	16,8	3,5	3,1	100,0
		% within I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned)	35,6%	31,3%	30,0%	44,4%	35,0%
		% of Total	27,3%	5,2%	1,0%	1,4%	35,0%
	High (6 - 7)	Count	124	29	3	4	160
		Expected Count	122,5	26,9	5,6	5,0	160,0
		% within I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned)	56,6%	60,4%	30,0%	44,4%	55,9%
		% of Total	43,4%	10,1%	1,0%	1,4%	55,9%
Total		Count	219	48	10	9	286
		Expected Count	219,0	48,0	10,0	9,0	286,0
		% within I do not find that waste sorting and recycling is very beneficial for the environment as claimedI do not find that waste sorting and recycling is very beneficial for the environment as claimed (Binned)	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	76,6%	16,8%	3,5%	3,1%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	13,128[a]	6	0,041
Likelihood Ratio	8,561	6	0,200
Linear-by-Linear Association	2,634	1	0,105
McNemar-Bowker Test			.[b]
N of Valid Cases	286		

a. 5 cells (41,7%) have expected count less than 5. The minimum expected count is ,82.

Appendix 5

Table 21: Cross tabulation output from SPPS comparing worsened sorting habit and faculty

My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned) * At what faculty do you study? Crosstabulation

			BIOVIT	HH	KBM	MINA	LANDSAM	REALTEK	Other	Total
My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	Low <=2	Count	11	4	12	23	22	30	8	110
		Expected Count	14,1	4,6	14,1	18,7	21,4	33,6	3,4	110,0
		% within My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	10,0%	3,6%	10,9%	20,9%	20,0%	27,3%	7,3%	100,0%
		% of Total	3,8%	1,4%	4,2%	8,0%	7,6%	10,4%	2,8%	38,2%
		Adjusted Residual	-1,1	-0,4	-0,8	1,4	0,2	-1,0	3,2	
	Medium 3-5	Count	11	5	11	16	17	26	0	86
		Expected Count	11,0	3,6	11,0	14,6	16,7	26,3	2,7	86,0
		% within My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	12,8%	5,8%	12,8%	18,6%	19,8%	30,2%	0,0%	100,0%
		% of Total	3,8%	1,7%	3,8%	5,6%	5,9%	9,0%	0,0%	29,9%
		Adjusted Residual	0,0	0,9	0,0	0,5	0,1	-0,1	-2,0	
	High 6-7	Count	14	2	14	9	17	32	1	89
		Expected Count	11,4	3,7	11,4	15,1	17,3	27,2	2,8	89,0
		% within My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	15,7%	2,2%	15,7%	10,1%	19,1%	36,0%	1,1%	100,0%
		% of Total	4,9%	0,7%	4,9%	3,1%	5,9%	11,1%	0,3%	30,9%
		Adjusted Residual	1,0	-1,1	1,0	-2,1	-0,1	1,3	-1,3	
	Other	Count	1	1	0	1	0	0	0	3
		Expected Count	0,4	0,1	0,4	0,5	0,6	0,9	0,1	3,0
		% within My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	33,3%	33,3%	0,0%	33,3%	0,0%	0,0%	0,0%	100,0%
		% of Total	0,3%	0,3%	0,0%	0,3%	0,0%	0,0%	0,0%	1,0%
		Adjusted Residual	1,1	2,5	-0,7	0,8	-0,9	-1,2	-0,3	
Total		Count	37	12	37	49	56	88	9	288
		Expected Count	37,0	12,0	37,0	49,0	56,0	88,0	9,0	288,0
		% within My waste sorting and recycling habits has worsened after moving to SiÅs, compared to my former living situation. (Binned)	12,8%	4,2%	12,8%	17,0%	19,4%	30,6%	3,1%	100,0%
		% of Total	12,8%	4,2%	12,8%	17,0%	19,4%	30,6%	3,1%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	27,895[a]	18	0,064
Likelihood Ratio	27,575	18	0,069
Linear-by-Linear Association	3,046	1	0,081
N of Valid Cases	288		

a. 13 cells (46,4%) have expected count less than 5. The minimum expected count is ,09.

Appendix 6

Table 22: Years lived in SiÅs and ssatisfaction towards existing and new sorting system (for those whom it applies)

Satisfaction level with the new sorting system				Chi Square test				
Years in SiÅs	Low (<2)	Medium (3-5)	High (6-7)	Doesn't apply	X²	df	p	Cramer's V	Expected count
					1,847	6	0,933	0,057	Min.0 ,94 (16,7%)<5
New (<1)	7,0%	35,1%	22,8%	35,1%					
1-3 years	5,7%	33,5%	21,5%	39,2%					
4+ years	0,0%	31,3%	25,0%	43,8%					
Satisfaction level with the current sorting system				Chi Square test				
Years in SiÅs	Low (<2)	Medium (3-5)	High (6-7)	Don't know	X²	df	p	Cramer's V	Expected count
					8,994	6	0,174	0,177	Min. 0,17. (41,7%)<5
New (<1)	15,8%	58,8%	25,4%	0,0%					
1-3 years	19,6%	55,7%	22,8%	1,9%					
4+ years	6,3%	87,5%	6,3%	0,0%					

It can be observed from the results that no matter how long the student has resided in SiÅs dorms, it is independent of level of satisfaction as $\chi^2 = 1,847$ and p = 0,933 and $\chi^2 = 8,994$ and p = 0,174. There is no significant relationship between the two variables.

Table 23: Concern with environmental challenges and proper recycling cross tabulated with satisfaction towards waste sorting in accomodation.

I am concerned with environmental challenges and proper recycling of waste (Binned) * . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned) Crosstabulation							
			. How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)				Total
			Low <=2	Medium 3-5	High 6-7	Other	
I am concerned with environmental challenges and proper recycling of waste (Binned)	Low <=2	Count	0	2	4	2	8
		Expected Count	1,4	4,7	1,8	0,1	8,0
		% within . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)	0,0%	1,2%	6,1%	66,7%	2,8%
		% of Total	0,0%	0,7%	1,4%	0,7%	2,8%
	Medium 3-5	Count	11	47	15	0	73
		Expected Count	12,7	42,8	16,7	0,8	73,0
		% within . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)	22,0%	27,8%	22,7%	0,0%	25,3%
		% of Total	3,8%	16,3%	5,2%	0,0%	25,3%
	High 6-7	Count	38	119	47	1	205
		Expected Count	35,6	120,3	47,0	2,1	205,0
		% within . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)	76,0%	70,4%	71,2%	33,3%	71,2%
		% of Total	13,2%	41,3%	16,3%	0,3%	71,2%
	Other	Count	1	1	0	0	2
		Expected Count	0,3	1,2	0,5	0,0	2,0
		% within . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)	2,0%	0,6%	0,0%	0,0%	0,7%
		% of Total	0,3%	0,3%	0,0%	0,0%	0,7%
Total		Count	50	169	66	3	288
		Expected Count	50,0	169,0	66,0	3,0	288,0
		% within . How satisfied are you with the current sorting and recycling condition in your accommodation? (Binned)	100,0%	100,0%	100,0%	100,0%	100,0%
		% of Total	17,4%	58,7%	22,9%	1,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	53,657[a]	9	0,000
Likelihood Ratio	20,593	9	0,015
Linear-by-Linear Association	5,800	1	0,016
McNemar-Bowker Test	116,804	6	0,000
N of Valid Cases	288		

a. 10 cells (62,5%) have expected count less than 5. The minimum expected count is ,02.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	0,432	0,000
	Cramer's V	0,249	0,000
	Contingency Coefficient	0,396	0,000
N of Valid Cases		288	