ENCOURAGING SUSTAINABLE BEHAVIOUR

A thesis uncovering ways to promote sustainable behaviour in the customer care phase of clothes' PLC

by

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b. ACKNOWLEDGEMENTS

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Please note!

Enclosed at the back of this hardcopy is a CD-ROM containing the raw data of gathered washing data, survey results, and detergent measurements. It also contains sound files of the interviews with Hanna Løyte from SPT and Benjamin Borum Olsen from KL.7, as well as four residents from Kollegiet Sofiegården.

c. Resumé

Siden den industrielle revolution har vores forbrug af tøj og den måde, hvorpå vi vasker det accelereret. Dette udgør en stor risiko for klimaet og dens ressourcer. Da denne udvikling spås at fortsætte er det vigtigt at gøre en aktiv indsats på dette område. Forretningsmodeller så som Fast Fashion er med til at udvande forbrugernes forhold til kvalitet, hvilket har medført, at forbrugeren ikke går op i at passe på sit tøj. Lavere kvalitet betyder tøj der hurtigere bliver slidt og i sidste ende bortskaffet, hvilket betyder mere affald. Denne udvikling er ikke bæredygtig. Dog skal indsatsen ikke kun komme fra industrien, hvis udviklingen skal ændres. Forbrugeren bærer også sin del af ansvaret, da det er vedkommende der køber det billige tøj og desuden vasker for meget ved for høje temperaturer. Forbrugerens rolle er derfor vigtig, da selv små ændringer i vaskevaner og den måde tøjet behandles på kan være med til at sænke den samlede CO_2-udledning i tøjets livscyklus (PLC).

Hovedformålet med dette speciale har været at undersøge måder, hvorpå man kan fremme bæredygtig adfærd i forbrugerfasen af tøjets livscyklus. Dette indbefatter bl.a. en undersøgelse af vaskevaner samt måder, hvorpå vi behandler og skaffer os af med tøj. Derudover har jeg undersøgt, hvilke barrierer og muligheder der er for at ændre denne adfærd. Her har jeg fundet ud af at der er stærke interne og eksterne normer som styrer den måde vi opfatter tøjs renhed. Derudover er vi styret af interne følelser samt kognitiv bias. Adfærdsteori tager udgangspunkt i, at mennesket gør brug af to adfærdssystemer; det refleksive og det automatiske system. Hvor det refleksive tager sig af de komplekse opgaver, så tager det automatiske sig af de automatiserede processer. Da det refleksive system har begrænsede ressourcer anvendes der forskellige bias i beslutningsprocessen, hvilket kan lede til irrationelle og dårlige vaner, såsom at dossere vaskepulver på slump.

Den teoretiske tilgang til dette emne har været et quasi-eksperiment udført i vaskerummet på Kollegiet Sofiegården på Christianshavn, hvor jeg bor og hvor jeg har testet om nudging-metoder, samt information vedrørende bæredygtig tøjvask kunne fremme bæredygtig vaskeadfærd.

Gennem 6 undersøgelsestrin har jeg testet forskellige redskaber fra adfærdsteori og CBSM (Consumer-Based Social Marketing). Dette har påvist små ændringer i forhold til at vaske ved 30°C, samt nedsætte forbruget af vaskepulver.

Ved at lave aktiv research, gennem test af vaskeprogrammer, samt observationer fik jeg inspiration til at give vaskerummet et løft, samt designe nye skilte, tilføre redskaber, samt vejledninger om bæredygtig vaskeadfærd.

Et 2-trins spørgeskema blev uddelt til alle 156 beboere på kollegiet, hvoraf 56 svarede i første runde og 40 valgte at besvare begge skemaer. Disse skemaer samt 6 semistrukturerede interviews med 2 eksperter på området og 4 beboere gav tre vigtige indsigter som diskuteres i specialet:

1. Der eksisterer en kløft mellem holdninger og adfærd, når det kommer til at vaske tøj bæredygtigt
2. Tidligere oplevelser har indflydelse på den måde vi modtager information og skaber bias, når det kommer til at vaske tøj
3. Tøjvask har lav prioritet og hovedformålet er at få rent tøj

Disse indsigter udgør barrierer for at fremme bæredygtig vaskeadfærd.

Jeg konkluderer, at det er sværere at ændre adfærd end som så og at der i mit quasi-eksperiment var flere barrierer, så som, at programmet for 30°C vask havde en kort centrifugering, hvilket betyder, at brugeren skal køre en ekstra centrifugering for at gøre tøjet ligeså tørt som ved 40 programmerne. Dette betød for nogle, at de fravalgte 30°C.

Hvor adfærdsteori byder på en række redskaber til at fremme en ønsket adfærd, såsom bæredygtighed, så er det svært at ændre adfærd i forhold til vasketemperatur, da folk ofte har en fast rutine og forbinder renhed med en specifik temperatur. Derudover er mennesker i udgangspunktet risikoaverse og frygter urent tøj, hvilket er en stærk barriere. I vaskesituationer med lav prioritet og ved uvidenhed, så følger de ofte status quo. I forsøgsperioden var 40°C det mest valgte program, hvilket må tages som udtryk for at brugerne er tilfredse med resultatet ved denne temperatur.

Fremadrettet mener jeg dog, at adfærdsdesign kan bruges til design af vaskemaskiner med et standardprogramvalg (default) som udgangspunkt, f.eks. 30°C, og en mere intuitiv brugerflade. Gennem CBSM kan man arbejde målrettet med boligforeninger med fælles vaskerum for at nedbryde barrierer, holdninger og fordomme overfor tøjvask ved lavere temperaturer.

1. CONTENTS

2. INTRODUCTION

We are currently using the Earth's resources faster than they are replaced. The forecasts are looking dull, but it is the way and speed in which we change behaviour that determines, how fast this change will occur (Jowit, 2008). The clothes we wear are an overlooked factor, when it comes to saving energy and resources; a fact, the clothing industry is slowly becoming engaged in.

In regard to the environmental impact of clothing industry, the general focus in public opinion and in media is on the industry's own responsibility for pollution, waste etc. Many stakeholders in the industry recognize this, but at the same time there is a need to acknowledge the human factor in the consumption process. Over the course of clothes' Product Life Cycle (PLC) there are four broad impact areas that influence the degree of pollution; sourcing of raw materials, manufacturing, transportation, and customer care (Natural Resources Defence Council). In this project I focus my attention on customer care, i.e. particularly laundry and clothes care practices. In this field, the potential for reducing the environmental impact in terms of water, energy, chemical and material consumption is considerable.

Research show almost 40% of the environmental impact a garment makes happens in the user phase after the garment has been bought (Junker, 2014). As washing machines have become a standard household device and the frequency of doing laundry has gone from being a weekly task to becoming almost daily for many households, there is a lot of potential in analyzing the behaviour and promoting sustainable ways of doing laundry. Furthermore, with the growing number of washing machines, especially in the developed world, one might ask if it is sustainable when the developing world adapts the same routines or whether we should work towards more sustainable ways of washing clothes altogether.

The essential willingness among people seems to be present and the ideas for change are plenty. Chip Bergh, the CEO of jeans producer Levi Strauss & Co., has claimed that he does not put his jeans in the washing machine, but instead spot cleans and airs them in order to make them last longer and save water (Lutz, 2014).

When it comes to sustainability, research from the Danish Competition and Consumer Authority show 62% of the Danes claim to have bought sustainable products within the last month. At the same time, more than half answer that better information would make them buy even more sustainable products (Konkurrence- og Forbrugerstyrelsen, 2011). Thus, there seems to be an interest on the consumer side for sustainable consumption.

This thesis started as a general wondering about why we have become accustomed to washing our clothes constantly, often when they are not even dirty. Is it out of habit, because we want to feel clean, or simply because we perceive them as dirty?

Furthermore, I experienced a genuine problem at my dorm as residents would overdose detergent when washing clothes in the common laundry room. Not only was this bad for the environment, but it led to frequent breakdowns of the machines.

Studies have shown that humans have limited cognitive resources available and in a complex world we are constantly being bombarded with various stimuli and information that craves our attention, making it hard to make sound reflective decisions (Heuer, 1999; Thaler, et al., 2008; Kahneman, 2011).

Many of us will recall at one stage or another making a new year's resolution; quit smoking, lose weight etc. But why is it that we say and make plans for something and yet fail to follow through? Is it because generally people want to talk the talk, but fail to walk the walk? Are there viable methods to change the laundry practices of people from a practitioner's perspective?

These are the dilemmas and inconsistencies in relation to laundry and clothes care practices that I explore in this project.

2.1 Problem Definition

Over the course of a day humans are met with a large number of choices and decisions. Often there is not enough time to make conscious decisions about every detail and action. Therefore humans are largely dependent on an automatic system that helps them automate actions, e.g. most people will never forget how to ride a bike once they have learned it and they will also internalize a familiar route home once they have driven it a few times. This is due to the automatic system - the mind goes on auto-pilot so to speak (Thaler, et al., 2008; Dolan, et al., 2010; Kahneman, 2011). While this can be convenient when carrying out routine chores, it can also lead to bad habits, e.g. smoking, taking the elevator instead of the stairs, or, specific to this project, dosing the washing machine by the eye instead of making a conscious decision on whether the amount is right or not.

According to the Danish industry association for soap, perfume, and technical/chemical products, SPT, Danes are among the Europeans who wash clothes at the highest temperatures using more energy and subsequently emitting more CO2 (SPT, 2014). Danes wash 80% of their clothes at 40°C or above and only 18% are washed at 30°C (SPT, 2014). Paradoxically, when comparing the laundry habits with the willingness to buy sustainably mentioned earlier, it does not translate into sustainable routines when washing clothes; hence, people may go buy the most sustainable detergent, but when it comes to using it they are less environmentally conscious. Whether this is due to lack of knowledge on how to wash sustainably, force of habit, or an unconscious idea that cleanliness is linked to temperature remains a mystery. Therefore, I want to explore whether and how users can be motivated to change their automated laundry and clothes care habits.

The thesis project will focus on examining, analyzing, and understanding consumer behaviour in the customer care phase of the clothes' PLC in order to uncover whether there are ways in which consumers can be guided into behaving more sustainably in their laundry and clothes care practices. The pivotal point of the project is qualitative and quantitative research among urban student residents.

Whilst government bodies and media focus much of their attention on replacing traditional energy sources with renewables and reducing the industrial emissions as well as the general level of energy consumption, research point out that there are also environmental gains to be made on the small scale by attempting to influence the behaviour of individuals (Osbaldiston, et al., 2012). According to the international association for soaps, detergents, and maintenance Products, A.I.S.E., the average washing temperature in Denmark was 43°C in 2013 (A.I.S.E., 2013). Interestingly, a reduction of the average temperature by 3°C would eliminate emissions equivalent to 11.000 cars (SPT (1)). Thus, a small scale reduction of washing temperature by consumers would make a huge difference altogether.

The focus of the project is to take a closer look at the 40% of environmental impact happening post-purchase of clothes. This includes conducting a quasi-experimental project that encourages people to apply more sustainable laundry and clothes care practices.

2.2 Purpose of the Project and Research Question

The field of behavioural design and the sub concept of choice architecture have for long been used by marketers to influence consumers into buying products and drive consumption (Larsen, 2014). Since the book *Nudge* by Thaler and Sunstein (2008) there has been increasing interest from decision-makers in the area of behavioural economics, as the book suggests solutions to some of the main challenges facing society in this century, e.g. obesity, healthcare, retirement plans etc.

Taking inspiration from environmental psychology, behavioural theory, and the concept of *Community-based Social Marketing* developed by McKenzie-Mohr, the goal of the thesis is to develop, use, test, and evaluate a *Consumer-based Social Marketing Strategy* that encourages and teaches people to act more sustainably in regard to laundry and clothes care practices.

My research builds upon one main research question followed by four sub-questions;

How do you encourage sustainable behaviour in the customer care phase of clothes' PLC?

1) *Which factors influence laundry and clothes care practices?*
2) *How do habits guide human behaviour?*
3) *Which barriers exist to behavioural change?*

4) What opportunities exist to change unsustainable behaviour?

2.3 Scope and Delineation

The scope of the research is limited to laundry and clothes care practices in the customer care phase of clothes' PLC. Clothes care practices are understood as aspects of clothes treatment, repairing, recycling, and disposal.

The quasi-experiment along with the survey gives an insight into the laundry habits of residents living in a urban student dorm over a specific period of time; thus, it cannot be translated directly to a broader population as it is too group specific, but it may give us some valuable insight into attitudes and behavioural patterns with regard to the laundry and clothes care practices of people.

Further, the research is dependent on data from the laundry room and the personal answers and opinions from survey and interview participants; thus, it cannot account for other aspects of laundry and clothes care practices happening e.g. in the participants' own home. Also, it cannot measure e.g. to which degree the clothes are dirty.

When I use the term sustainability in the project it only concerns the customer care phase of the clothes' PLC and its environmental impact. Other aspects of sustainability, like industry emissions, are beyond the scope of my thesis.

It is my intention to formulate recommendations for a behavioural change strategy with nudging as a key element.

2.4 Thesis Structure

The next chapter is a literature review and theoretical framework that gives us insight into social practices within laundry and clothes care, behavioural theory, as well as tools and methods to encourage sustainable behaviour. The chapter concludes by making two propositions for the quasi-experiment.

The fourth chapter explains the research methodology used. Here, the strategy, the theory, the data collection process, the data analysis, the data validity, replicability, and reliability, as well as the research quality are described and discussed.

The fifth chapter presents the research design and research process. The research sample is portrayed; the individual project stages and the course of events are described; as well as the interview data being summarized.

The sixth chapter presents and discusses the research findings. It ends with the conclusions being summed up.

Chapter seven reflects on the managerial implications of the project and its findings.

Chapter eight and nine concludes the thesis with the source list and appendices respectively.

3. LITERATURE REVIEW AND THEORETICAL FRAMEWORK

The literature review will provide an insight into history and the past academic research in the field of study, i.e. I will examine the laundry and clothes care practices, behavioural theory, as well as tools and methods to encourage sustainable behaviour.

3.1 Social Practices within Laundry and Clothes Care

Rosling (2010) labels the washing machine as the greatest invention of the industrial revolution. Women no longer had to spend hours doing laundry and it suddenly freed up valuable time for reading and studying sparking the whole women's movement and liberating women to be independent and making it possible for them to work outside of their home (Rosling, 2010).

Moreover, I would argue, the washing machine was not only a revolution for women, but for all people's general perspective on clothes. Along with clothes becoming gradually cheaper and more abundant, the advance of the household washing machine meant people were not required to use a painful amount of time on washing by hand, go to the dry cleaners, or to the local laundromat. People could do it at home and suddenly clothes were a given thing; for the mainstream consumer, it became a *nice to have*, not a *need to have*.

The modern perspective on clothes influences the clothes care practices, as the abundance of low-cost mass-market clothing has consequences for the way we take care of our clothes. Research showed that 25% of young people between 18 and 29, within a year, had shopped for new clothes because their clothes were in the laundry (Eskildsen, 2014). From 2003 to 2010 the amount of fabric used for clothes production increased by 36% and, in addition, 80% of the clothes that Danes throw out still has 75% of its life in it; hence, consumers are buying more clothes, but not bringing them to full use (Eskildsen, 2014).

The main reason for the devaluation of clothes is to be found in the market place. The mechanical and technological improvements since the industrial revolution in the 19th century have significantly increased the speed in which garments and clothes are made subsequently reducing their price; thus, the term *Fast Fashion* has been coined. The development is a consequence of several factors; Firstly, it is a result of customer demand and constantly changing fashion trends (Barnes, et al., 2010). Secondly, companies have enhanced their supply chains by making them very agile (Barnes, et al., 2010). Thirdly, the time and cost of transportation is ever decreasing (Hoffmann, et al., 2010). Fourthly, new and cheaper materials have been developed e.g. polyester (Fletcher, 2008). Fifthly, the technological advances of today imply that some brands present new collections every few weeks (Gardetti, et al., 2013).

As a result of the Fast Fashion success, the market is flooded with clothes which are all supposed to be sold within a narrow timeframe making the competition fierce. The clothes quality is quite mediocre and often short lived compared to premium-priced clothes or clothes you would buy around 50-60 years ago; at that time, the average person would maybe buy one high quality jacket and wear it for long time, whereas today the average person would probably have several jackets in lesser quality to wear for short periods of time. In effect, Fast Fashion is wearable and fits, but it generates its own demand all the time by being of less quality and inexpensive.

Therefore, the growth in mass-market Fast Fashion affects our clothes care practices. Since these clothes present little value to the single consumer, the Fast Fashion trend impacts the frequency in which we dispose of the clothes; thus, the less expensive clothes, the less people's incentive to repair clothes if damaged, and the more likely they are to be thrown out.

With the acceleration of production and sales in the clothing industry, it has become one of the most polluting industries in the world, only surpassed by the oil and gas industry (Andersen, 2013). As a consequence, even small changes to our laundry and clothes care practices have an impact, both within the clothing industry, but also in the consumption phase. According to Junker (2014) almost 40% of a garments environmental impact happens after the garment has been bought; thus, a substantial effect is in the hands of the consumer - not just in the products they choose, but in how they treat the clothes and discard them when they are no longer of use.

Contrary to the buy, wear, and discard mentality of Fast Fashion, the number of washing machines around the world is increasing largely because the developing world is raising its living standards (Rosling, 2010). Thus, creating sustainable laundry practices is ever more important. Laundry practices have evolved significantly over time. The ancient people of Rome used to wash at local streams and pound or rub their clothes on rocks and in sand to get the dirt of. In 1797 the washboard was developed, which still meant hard manual labour (Bellis). By the early 19th century laundry would still be done by hand using washboards at rivers and streams only once or twice a year; however, in 1851 the industrial revolution entered the world of laundry when, American inventor, James King patented the first hand-powered washing machine drum which was later followed by a rotary-powered machine (Bellis; Gyldendal). In 1908 the inevitable happened when Alva J. Fisher invented the first electric-powered washing machine (LG Electronics, 2011).

After the Second World War things went fast in the Western World and the modern consumer society as we know today was formed, i.e. by the 1950's washing machines also entered Danish family households (LG Electronics, 2011; Gyldendal). At the time, these appliances were expensive compared to the average income so usually 6-8 families would join-in and buy and share a machine together (Gyldendal). Because of

constant mechanical and technological developments combined with intense market competition and economies of scale, a washing machine is now an inexpensive and common item in most western households. In 2014 82% of Danish households owned a washing machine and 54% a tumble drier (Danmarks Statistik).

In effect, laundry and clothes care practices have gone from being an almost yearly event 200 years ago to becoming a weekly or even a daily task for many people; accordingly, we have changed habits from doing laundry very rarely to extremely frequently. Consequently, the total amount of clothes being washed in Denmark has increased by five times from 1950 to 2000; partly, due to a growth in population, but mainly caused by the easy access to washing machines, changed dressing and laundry habits, as well as the introduction of synthetic textiles needing more intense washing cycles (Gyldendal).

Doing laundry has become more automated and little effort is needed when washing clothes, i.e. load, program, dose, and start the machine. The most modern machines will even program and dose by themselves, i.e. via sensors they are able to judge the type of textiles in the machine, how soiled or stained they are, and their weight; thus, removing all inaccurate human factors in the laundry process and making it very efficient and ultimately sustainable (Siemens AG).

However, these full-automatic machines are still in the introduction or growth phase of a standard PLC curve; hence, the majority of households still have traditional machines that need programming and correct dosing to function and, therefore, it is still important that people are equipped with the right knowledge for doing laundry. Normally, learning laundry skills is process were parents transfer tacit knowledge to their children. Very few societal institutions offer people courses in doing proper laundry and there is a danger that less and less people know how to do laundry. A survey showed that among 2000 Danes approximately 70% stated that they wash their underwear with the rest of their clothes. 76% of these also stated that they wash their clothes at 30°C or 40°C. This is a serious health issue since bacteria is not killed below 60°C, i.e. people run the risk of getting ill from dangerous coli bacteria (Fahnøe, 2013). Even though this does not relate to sustainability, it might mean the learning curve of people for washing clothes sustainably is very steep, making it difficult to encourage them into more sustainable behaviour.

Swedes are usually very similar to Danes. A study by Gwozdz, et al., (2013) found that the average Swede, aged 16-30 years old, washes his or her clothes on average at 40°C like the Danes. Further, the Swedes wear their trousers and skirts about four times before washing; whilst t-shirts and similar clothing is washed after just two times wear. In relation to clothes care, they only mend clothes once in a while (Gwozdz, et al., 2013). Thus, Swedes wash at the same average temperature as Danes and they wash, even their trousers, very frequently.

3.1.1 Hygiene, Cleanliness, and Care

Originally washing laundry was promoted because of hygiene in order to avoid deceases from spreading. Clothes would be boiled in kettles to remove bacteria and lice. Since then various products have been developed to enhance the process in order to make clothes cleaner, whiter, softer, and remove smell. Over the years manufacturers of washing machines and laundry detergent have successfully transferred the focus of the laundry process from removing bacteria to also improving whiteness, softness, and freshness (Shove, 2003).

The feeling of cleanli-, white-, soft-, and freshness are emotional labels that consumers attach to their laundry, e.g. for some, tumble drying clothes items may result in a comforting feeling of softness (Entwistle, 2013). Further, some individuals may connect, e.g. dosing slightly more detergent than what is recommended with cleanliness. However, it is personal deception and without scientific basis.

People's perception of cleanliness may reach frantic levels:

> *"Clothes with grass stains should never be discarded, because now it is possible to remove grass stains completely."*
>
> *(Freely translated (Reckitt Benckiser Inc.))*

No doubt it is good for clothes care that we have stain removers, but why should clothes be thrown away because of some grass stains in the first place? To me it is a symbol of the frantic emotions sometimes surrounding laundry. This is a consequence of a public ideal created more than century ago that a good housewife washes completely clean, otherwise she probably cannot do satisfactory housekeeping; thus, women would go out of their way to not be judged a bad housewife by their social circle. This ideal was captured by producers and advertisers in the 1950-60's depicting the good housewife as one washing completely clean and white with their product. The ideal still exists today as people will tend to throw out clothes if they are too stained. I will be elaborating on social norms in section 3.1.3.

While white- or cleanliness may be important for some, there are also potential health issues that need to be taken into consideration, when washing clothes, e.g. the Danish health authorities are asking people to be precautious when washing at 15-20°C. Further, they divide laundry into three main categories given advice on how to handle:

- 80°C or above is for clothes with blood or other bodily fluids on them,
- 60°C is for washing underwear, towels, kitchen cloth, and bed linen,
- 30°C or below is for washing other clothes you might normally wash at 40°C (Sundhedsstyelsen, 2010).

Contrary to the Danish health authorities, the Danish Consumer Council advises people to evaluate how dirty their clothes are before lowering the temperature from 40°C to 30°C (Kofoed, 2014). Unfortunately, the different advices create a risk of confusing the consumer.

In regard to care, industry standard laundry and care symbols are designed to make it easier for consumers to treat their clothes, e.g. showing the maximum washing temperature, whether it can be ironed, tumble dried, dry-cleaned, tolerate bleach, should be washed separately etc. Furthermore, the consumer usually gets information on the fibre content. In spite of the explicit symbols, they may, in some cases, turn out to be misleading, e.g. much underwear is labelled with 40°C washing temperature; however, this contradicts the official advice of 60°C from the Danish health authorities. Again, it confusing for the consumer.

3.1.2 Chemicals

The use of chemicals in laundry practices have evolved over the years, going from inefficient soap bars made from animal fat and ashes, to the modern and efficient detergents containing biological enzymes (SPT (2)).

The combination of washing temperature, water usage and detergent or other substances influences the environmental footprint of washing cycles. SPT identifies two reasons for why people may lower the washing temperature:

1. Modern washing detergent containing highly advanced and efficient enzymes,
2. Modern washing machines being efficient even at low temperatures (Medgyesi, 2014).

Thus, many modern washing detergents contain enzymes ensuring a good result even at low temperatures. However, the dosage of washing detergent is determined by three factors:

1. Weight of load,
2. Degree of soil and stains,
3. Degree of water hardness.

The more wash load, the more detergent is needed. This also applies to degree of soil and stains; the more dirt, the more detergent is needed. Hard water has a high content of lime making detergent less efficient and, hence, more detergent is needed compared with soft water. Further side effects of hard water are increased energy usage and decreased lifespan of the appliance; therefore, many housing associations invest in softening units to process the water before it goes into the washing machine (HOFOR (1)). Unfortunately, the combination of the different dosage factors may make it

demanding for some people to dose right. Further, they may be limited by a lack of information on water hardness.

Overdosing of machines is more harmful than it seems. Not only does it affect the environment by polluting more, it may also leave soap residue on the laundry and clog the machine causing breakdowns. In addition, it is costly.

In relation to the hardness of water, the main utility company of Copenhagen City, HOFOR, which amongst others supplies water to the city, considers softening the entire water supply to the city in 2022. Reducing the amount of lime centrally has three main advantages:

1. It reduces energy consumption significantly,
2. It reduces the need for a broad spectrum of detergents and chemicals,
3. It increases the lifespan of machines and appliances (HOFOR (1)).

HOFOR estimates annual energy savings of 18.3 million kWh in Copenhagen city, equivalent to the consumption of 4000 families and a reduction in CO_2 emissions of 9200 tons annually. For each individual family (4 persons) it would mean annual savings of around 500 DKK due to the reduced consumption of electricity, washing detergent, soap, shampoo, decalcifiers etc., as well as 50% longer lifespan on household appliances such as kettles, coffee makers, washing machines, and dishwashers (HOFOR (1)).

With regard to chemical usage in laundry, the Danish supermarket chain, Irma, in October 2014, removed fabric softener from its shelves (Irma). It was a consequence of decreasing sales among its relatively eco-conscious customers and the fact that more people suffer from allergies. The environmental manager at Irma stated:

> *"We know that our customers are more aware of the environment than the average, and they expect us to show responsibility, what we historically have done in other cases."*
>
> *(Freely translated (Irma))*

According to the FDB Green Index, 53% of Danes do not use fabric softener (Irma). This is a sign that Danes want to act sustainably, also in regard to laundry practices.

3.1.3 Social Norms

According to Jack (2013), routines and practices can only really be changed if you change the social norms of society:

> *"Collective conventions are subtly and compellingly active in everyday life enabling the construction of routines, and routine consumption, and consequently they hold potential to shift practices away from intensive resource consumption in everyday life."*
>
> *(Jack, 2013)*

A number of social norms, emotions and senses influence our laundry and clothes care practices, e.g. perception of cleanliness, smell, and dressing habits (Klepp, et al., 2010). Cleanliness of clothes in the Nordic region often relates to age:

> *"The norm about cleanness also changes with age. Particularly in the Nordic countries, where a good childhood is strongly associated with active play in nature, children covered in mud and dirt are a sign of happiness and health. For school children, the focus on cleanliness increases. Among adults, the perception is that ill-groomed elderly people are even more unsavory than ill-groomed young or middle-aged adults."*

> *(Klepp, et al., 2010)*

As the quote implies the level of cleanliness is dependent on age and is socially bound because it is other people's perceptions that determines degree of cleanliness.

The idea of cleanliness is linked to sensory understandings, such as look, feel, and smell. Pink (2005) examines three cases of contemporary laundry practices in England and explains how people "construct and sense cleanliness" and how it reflects in their laundry routines. The case persons have sensory understandings of what is clean or not. Certain rituals and routines surrounding the task of doing laundry were linked to sensory understandings (Pink, 2005).

Through a small scale study Jack (2013) engaged 31 women to wear the same pair of jeans five days a week for three months without washing them and found that materiality, habits, and cultural contexts play a role in how cleanliness is perceived. By intervening in cleanliness conventions the participants reflected on their habits and conversations with them revealed that "the *expectation* of not washing was more repulsive than the *actuality"*, hinting that the need for frequent washing was just perception and that there may be an emotional barrier to changing practices (Jack, 2013).

Through an ethnographic study Jensen, et al. (2013) also found that there are social norms regarding the influence of hygiene on clothing habits. Women, although they do not personally find it problematic, will refrain from wearing the same outfit more than once a week being afraid that other people might judge it unhygienic (Jensen, et al., 2013).

Further, norms exist on methods on how to do proper laundry. A recent conversation with my aunt reflected how the laundry practices have changed over the years and how there are certain social norms linked to the right and wrong way of doing laundry. She is seventy and is about to move to a new apartment with her husband. While she was looking forward to moving in, her biggest concern was whether there would be a *clothes roller* in the laundry room in the new place. "A clothes roller makes tablecloths just right," she claimed. The idea that tablecloth and bed linen needs to be rolled in order to

be "right" reflects the ingrained social norms and morality of past laundry practices, especially if you wanted to be a good housewife.

In relation, despite the liberation of women, it is still women who do the majority of the laundry in the household. A recent study among 1000 Danish men and women aged 35-65 showed that 67 percent of women feel they are primarily responsible for the home's laundry, whilst only 25% of men stated the same. Accordingly, the associate professor at the Department of Culture and Identity at Roskilde University, Henrik Jensen, states: "...it is obviously not our genes that dictate who washes clothes, but traditions and ancestral cultural patterns" (Conradsen, 2015).

When it comes to clothes care, some companies are employing sustainable behaviour strategies by promoting low wash or no wash of their garments, e.g. Swedish brand, Nudie Jeans have established a jeans brand with a basic principle of sustainability advising their customers not to wash their jeans and also repair them if broken; accordingly, they offer their customers jeans repair shops at selected stores (Nudie Jeans Co. (1); Nudie Jeans Co. (2)). Not only does this promote sustainable lifestyle, but it also helps promote the brand and attract new customers.

In addition, a chart on their website guides customers to the appropriate time for washing jeans the first time. Also, so-called *jeans stories* are presented on their website in combination with user photos revealing the look of used Nudie jeans - worn, torn, and mended. The company claims not washing your jeans will give them more character, image, coolness etc.:

> *"WHEN YOU SLIP INTO a new pair of drys (ed. jeans brand), another kind of craftsmanship begins – the breaking-in. For some people, breaking in jeans is a sport. And for all of us, it's definitely a challenge. Breaking in a pair of dry jeans is a journey lasting six months. The outcome depends on how you travel. Sitting around in the office won't grace the denim as much as if used while repairing motorcycles. Regardless of your lifestyle, your jeans become a log of the months gone by – you might even end up with a few amusing anecdotes referring to different stains, abrasions, or scrapings."*

(Nudie Jeans Co. (3))

Hence, they are trying to give their jeans a special personality and thereby trying to differentiate themselves from Fast Fashion brands.

While the Nudie jeans company only represents a niche, Levi Strauss & Co. represents the mass-market and it has made public a *jeans manifesto*. Being official policy of the company, customers, as well as other jeans users, are encouraged not to wash their jeans, but spot clean them instead. The company wants "to challenge consumer laundry habits and the perception of how often jeans actually need to be washed" (Bergh, 2014). This has the benefit of reducing energy and water consumption; thus, making jeans use more sustainable.

Hence, promoting what Klepp (2010) coins *favourite clothes* encourages sustainable lifestyle:

> *"..."favorite clothes" represent an environmentally sound choice, because they are well cared for and therefore last longer, and they reduce the need for constant new acquisitions."*

> *(Klepp, et al., 2010)*

With regard to washing temperature Danes, on average, wash at a higher temperature than in the rest of Europe. As mentioned earlier, Danish homes wash 80% of the laundry at 40°C or above and only 18% at 30°C. 25% of Danes do not even know that clothes can become clean at 30°C. Half of the Danes wash 1-2 times at 90-95℃ every fourth night (SPT, 2014; Kristiansen, 2014). However, these numbers should be taken with a grain of salt as the sample was only 200 respondents (also see section 4.4 on secondary data). Despite Danes having an image of being environmentally conscious in other regards, a significant potential for environmental improvements exist if the social norm of washing temperature could be changed in a sustainable direction.

The example EU standard environmental labelling, e.g. A+++ energy label, on appliances has been an immense success in changing social norms and promoting the environmental consciousness consumers. As from 2013 EU has introduced legislation requiring all new washing machines sold in Europe to include a in order to stimulate consumers to wash colder (A.I.S.E., 2013). However, the EU reacts out of frustration that the consumers actually did not demand the option by themselves (Fletcher, 2008). The norm in Europe has been to wash at 40℃ on average and the consumer has been satisfied with the result; thus, no demand was build for the 20°C cycle despite the technology existing for years and the Japanese using the option as standard (Fletcher, 2008; A.I.S.E., 2013; H&R Group).

Washing machine manufacturers could also contribute further to changing social laundry norms among consumers by introducing e.g. technology that would tell the consumer about the environmental footprint of washing programs; thus, it would affect the choice of program. At the moment, most consumers, if they have not bought a fully automatic machine, are left to their own devices and the care label stating the maximum temperature.

3.2 Behavioural Theory

The classical economic approach takes its offset in the assumption that people are rational and act out of a cost benefit rationale that matches their choices. This approach argues that market forces "sweep down and correct irrational behaviour" and it depicts a *Homo Economicus*, who behaves rational and always acts by choosing the best outcome by maximizing own benefits (Ariely, 2009).

Behavioural theory takes its offset in a study where Tversky, et al., (1974) demonstrated that humans are not solely rational but are guided by heuristics and biases. Since this study behavioural economists and psychologists have questioned the rational Homo Economicus (Ariely, 2009). Through different experiments, human behaviour has been explored, and various examples exist showing that humans do not always make rational decisions based on cost benefit.

Behavioural theory works with the assumption that there are two systems that govern behaviour; the reflective system and the automatic system (Thaler, et al., 2008). While the reflective system allows us to solve challenges such as mathematical equations and problem solving, and is characterized by being "controlled, effortful, deductive, slow, self-aware, and rule following", the automatic system helps us with more routine tasks and is characterized by being "uncontrolled, effortless, associative, fast, unconscious, and skilled" (Thaler, et al., 2008).

In essence we need both systems to function as humans. To give an example on how they work together, we need the reflective system to learn to drive the car and abide the traffic rules, but if a opposite driving car is about to drive into us, whilst driving we need the automatic system to reflect fast, hit the break, and evade the oncoming car.

But humans have limited cognitive resources and often using the reflective system can take effort and time. This can lead to faults and bad decisions that stem from situations, where we use the automatic system in reflective situations (Thaler, et al., 2008). As such humans often behave in irrational ways, making snap decisions, either under stress or out of laziness (Ariely, 2009). Even in situations, where we know that it does not have the best outcome, e.g. unhealthy behaviour, such as smoking or sitting in front of the television past bedtime aware that you need to get up early the next day. These are the times where we let the automatic system work as opposed to making the reflective system work.

As such, humans display cognitive limitations because making the right decision takes too much effort by the reflective system and, hence, humans let the auto pilot work for them:

> *"These cognitive limitations cause people to employ various simplifying strategies and rules of thumb to ease the burden of mentally processing information to make judgments and decisions."*
>
> *(Heuer, 1999 p. 111)*

Therefore humans develop cognitive biases which can be defined as "predictable mental errors caused by simplified information processing strategies" (Heuer, 1999 p. 2). This is due to "the human mind has difficulty coping with complicated probabilistic relationships, so people tend to employ simple rules of thumb that reduce the burden of processing such information." (Heuer, 1999 p. 122).

"Cognitive biases are similar to optical illusions in that the error remains compelling even when one is fully aware of its nature. Awareness of the bias, by itself, does not produce a more accurate perception. Cognitive biases, therefore, are, exceedingly difficult to overcome."

(Heuer, 1999 p. 112)."

Because, they are so hard to overcome, these can be exploited commercially.

Ariely and Norton (2010) discuss the different types of decision errors that come from either thinking too little or thinking too much. Thinking too little, is helpful, whilst carrying out routines activities. But when it comes to making long-term decisions, i.e. insurance, pension, and bank loans, thinking too little can lead to forgone "utility" or loss of a potential gain (Ariely, et al., 2010). An example is a recent study that found loyal customers did not get better interest rates for being loyal, but instead missed out on better interest rates on loans offered by competing banks (Iversen, et al., 2015). The reasons that people often stay loyal, can be that people find it difficult or exhausting to go through and compare terms and conditions, either because it takes too much time or effort, as well as insight is needed. Therefore, some might chose, out of habit, to stay with the same company and miss out on an opportunity to save money or get better conditions (Iversen, et al., 2015).

Errors when thinking too much can occur when choosing e.g. a phone. People might get overwhelmed, or even paralyzed by the different features that exist instead of focusing on their particular need and going for the solution that best suits that need. In this situation you either trust the salesman to give you the guidance you need to make a decision, or you sit down and investigate the subject matter in order to find the product that best suits your needs. As many people do not have the time or interest in doing such research, the consequence may be that you end up with an inadequate device with too few features that you need and like to use and far too many that you have no need for.

This may also be the case, when choosing a washing machine as there can be many different products to choose from. Elements such as needs, affordability, and ease of use are factors that play a part. A washing machine's running cost can be an obstacle when rating the different options, i.e. a cheap machine might prove to be more expensive in the long run in terms of energy and water consumption compared to the expensive which is more efficient. The EU energy labelling of washing machines categorizes machines into A+++ and down to category D and uses colour coding in a salient way to guide customers into making more efficient choices (Energistyrelsen; A.I.S.E., 2013).

These are examples of how our cognitive biases can affect us when making long term decisions, and it might lead us to make decisions that are less optimal in the long run.

The automatic system is characterized by a number of traits and capabilities that we share with animals:

"We are born prepared to perceive the world around us, recognize objects, orient attention, avoid losses, and fear spiders."

(Kahneman, 2011 pp. 21-22)

Therefore the automatic system can also lead to such biases as loss aversion using anchors when making decisions. At the same time, we are social animals that herd together and being prone to not stand out from the crowd. So sometimes we do things because of social norms without reflecting on it.

Other drivers of human nature influence us in our everyday lives, and emotions can run away with people. These include passion, arousal, anger, and addiction (Elster, 2000). When humans experience these emotions, they find it hard to keep a cold head and think in a rational manner. Some give in to these urges for the sake of instant gratification and they may not consider the consequences in the heat of the moment, e.g. eating chocolate gives instant pleasure as it releases endorphins (BBC news, 2007). Yet, giving in to this urge, too often, may have consequences for the waist line.

In situations, where humans are aware of their own limitations, or want to give in to their passions they can employ strategies to overcome these, either by pre-committing to a certain behavior or employing different devices for pre-commitment (Elster, 2000). For example if you want to lose weight a strategy could be to only store healthy foods at home and bring your own lunch pack to work; thus, not become tempted by unhealthy options. Elster (2000) characterizes this as a device for eliminating options, i.e. simply taking the option of unhealthy foods away. Hence pre-commitment is a means of gaining control in situations, where there is passion, anger, and temptation involved. By making the decision with cold head one avoids making the decision, which might end up being a poor decision.

As such the *Save More Tomorrow* scheme by Thaler, et al., (2008) can be seen as a pre-commitment to saving up for retirement:

"By synchronizing pay raises and savings increases, participants never see their take-home accounts go down, and they don't view their increased retirement contributions as losses."

(Thaler, et al., 2008 p. 113)

More choices are not always better. Designing behaviour may enable better outcome since you can mitigate the fallacy of human cognition. Behavioural Design is a means of changing behaviour by addressing the automatic system and influence the behaviour of people without them consciously knowing the change in behaviour.

An example of behavioural design is defaults. Most of us know the default setting on the printer for the computer. This default setting ensures that you get a good result without any advanced knowledge on printers. This nudge takes advantage of the fact that

humans often go along with the status quo (Thaler, et al., 2008). Defaults come in different forms, e.g. ringtones, screensavers etc. The CEO of social media site Facebook, Mark Zuckerberg, has turned his wardrobe into one big default since he is always wearing the same style t-shirt and the same style jeans. Not that he does not change; he just owns multiple pieces of the same clothes. He explains his unique decision like this:

> *"I really want to clear my life to make it so that I have to make as few decisions as possible about anything except how to best serve this community."*

> *(Kim, 2014)*

This illustrates perfectly how defaults work and he has a point in the fact that it rules out several factors of everyday life making it a bit easier to manage.

Johnson, et al., (2003) examines organ donation and the possible advantages of designing a donation scheme as an opt-out, as opposed to an opt-in model; as a consequence, making organ donation the default setting. Research show that in European countries, where the default setting is opt-out, the number of registered organ donors is higher compared to countries using the opt-in model (Johnson, et al., 2003).

In essence, there is a lot to gain from default settings, whether it is a small element in your everyday life or it is broader public issues, defaults can make a difference.

Another method in behavioural design is nudging defined by Thaler and Sunstein (2008) as a means of helping people to make decisions without taking the choice and freedom away from them. Through choice architecture one can design what and how to present choices in a way that leaves the consumer better off (Thaler, et al., 2008). Nudging is defined as:

> *"...any aspect of the choice architecture that alters people's behaviour in a predictable way without forbidding any options or significantly changing their economic incentives."*

> *(Thaler, et al., 2008 p. 6)*

According to the authors "it is legitimate...to try to influence people's behaviour in order to make them better off. In other words, they argue for conscious efforts by institutions in the private sector and also by government to steer people's choices in directions that will improve citizen's lives. Nudge theory builds on *Libertarian Parentalism* and is often used as a means to help people improve decisions and behaviour without being lectured. Libetarian means to preserve the right to choose differently. Parentalism means influencing choices in a way that will make citizens better off; thus, as parents would guide their children (Thaler, et al., 2008).

The best example of nudging is the fly in the urinals at Schiphol airport in Amsterdam. Substantial amounts of urine ended up on the floor instead of in the urinals. The simple

trick was to strategically place a sticker of a fly inside each urinal. Most men would then aim at the fly and because it hit the right spot the spillage was reduced by 80%; thus, it reduced the cleaning expenses (Thaler, et al., 2008).

While a fly in the urinal is a very low practical way of using nudges, technology can also be used to nudge people for the sake of their own health and happiness. One example is the Jawbone, a modern device that is worn around the wrist monitoring sleep and stress levels and evaluating your performance. It informs and nudges its owner through the foot-in-the-door technique guiding the owner in a healthier direction (Kwong, 2014).

In the past number of years nudging has become increasingly popular with governments and municipalities and has lead to a number of government programs, as nudging is seen as a low-cost soft means of regulating citizens' behaviour as opposed to hard means like legislation, fines, and other types of punishment. With the latter often being expensive to implement and uphold (Dolan, et al., 2010; Engelhardt, 2011).

Although seemingly an easy fix, nudging also has its limitations. The TV-series *Vanens Magt* aired in November 2014 on Danish national TV with concept being that two hosts, labelled as experts, conducted a number of different experiments in order to get people to act more responsible. Here, nudging was presented as a holy grail that could make people change bad behaviour, e.g. by visual gimmicks such as footprints guiding pedestrians to the nearest by dustbin. While aired, the program received a lot of criticism; firstly, because one of the so-called experts was a trained designer rather than a behavioural scientist and, secondly, due to the fact that it simplified behavioural theory and, thirdly, because "you cannot make people act against their will, neither with the help of priming nor nudging"; hence, people will not want or do things they are not already instinctively and positively affiliated or experienced with (Zeller, 2014; Larsen, 2015 (1)).

Despite numerous case where nudging results in positive outcomes, the theory is also being criticised. White (2013) argues that nudging and the concept of Libertarian Parentalism are ineffective, unethical, and counterproductive (White, 2013 p. 60). He claims nudges are manipulative, unethical, and highly commercialized; thus, it has been used by marketers over the years for creating desire, needs, and wants in the consumer (White, 2013). Hence, it is no coincidence that sweets are often placed at the checkout of the supermarket and that music and smell is used to seduce the reptile mind and push consumption, e.g. the American apparel company Abercrombie and Fitch plays energetic music and engages its customers with scented air, lighting, and mirrors to attract its target group of young consumers (Larsen, 2014).

In essence, we are being nudged, manipulated, and influenced every day, when we walk outside the door, browse the internet, or read the news paper. However, as nudging gains popularity amongst government and other public organizations, it is also

important to questions the ethics of using subtle psychological methods to control and change behaviour. Some may question the legitimacy of public and governmental organizations using such tools. According to Thaler, et al., (2008) there are two basic rules that government and other institutions need to follow to make nudging acceptable for use:

1. Free choice,
2. Action should make people better off (Thaler, et al., 2008).

Vallgårda (2012) makes the case that nudging as such is not a new phenomenon, but instead a new word for an old concept that concerns making healthier choices easier and available. This may create enthusiasm around the concept, but when used by people they should also learn from past experience. Vallgårda (2012) also challenges the concept of Libertarian Parentalism, stating it is an oxymoron; a paradox, since libertarian indicates liberal lifestyle, whereas Parentalism indicates authoritative control (Vallgårda, 2012).

Contrary, Hansen, et al., (2013) argue that nudge theory is neither a nonstarter nor an oxymoron and divides nudges into four different categories, which takes into account the dual-process theory with two kinds of thinking; the automatic and the reflective way of thinking and then further divides these into transparent and non-transparent nudges. When the nudges are transparent, the user is aware that he or she is being nudged, whereas if they are non-transparent it may be a source of manipulation and lead to unintended negative consequences (Hansen, et al., 2013).

There is also a risk that nudging will be used as a fancy quick fix. A bike ride around Copenhagen illustrates a few examples; at dustbins you find green footprints leading up to them; meant to nudge people to throw trash in the bin instead of on the ground. At town hall, there is a display showing the number of cyclists that have passed today and in the past year, i.e. it should encourage you to take part in the bigger social movement of cycling into town instead of taking a car. At first they seem like nudges, as they are only encouragements; not prohibitions or a raised finger, but are they really making people better off? I do not see my life improved by the funny markings and some unspecified number on a display; I would still bike if the display was not there and I would still throw my waste in the dustbin without fancy markings. Who is influenced by these alleged nudges? Who is it that is convinced of biking by being part of a social norm and who is it that would throw his/her trash on the street before and now thinks it is worthwhile walking over to the dustbin and place the trash because of some green footprints; sorry, I am not convinced.

Ultimately, while behavioural theory can offer solutions to changing behaviour, there is also a risk that it ends up being just another quick fix that inevitably has no real effect on behaviour.

3.3 Tools and Methods to encourage Sustainable Behaviour

So with challenges such as habits, norms, perceptions of cleanliness, cognitive biases, and limited human cognition playing a part in everyday life, how can sustainable behaviour be promoted in a way, which makes it easy for people to take action? As such there is no *one size fits all* and there can be numerous barriers against taking action and behaving more sustainably. The ideal sustainable person is one who "...consciously seeks to minimize the negative impact of one's actions on the natural and built world." (Kollmuss, et al., 2002 p. 240).

3.3.1 Barriers to Sustainable Consumption of Resources

When it comes to grasping large concepts, statistic data in particular, people lack images that evoke vivid images (Heuer, 1999). So while climate change gets a lot attention from, politicians, organizations and the general media, it is harder to grasp for individuals in their daily lives. Consumers can find it hard to grasp the consequences of their own consumption and resources, such as energy consumption, since it is hidden on a daily basis and only noticed when the bill arrives once or twice a year. So if consumers find it hard to believe that they can make a difference, they are likely to either overlook or ignore the personal impact:

> *"People with a strong locus of control believe that their actions can bring about change. People with an external locus of control, on the other hand, feel that their actions are insignificant, and feel that change only can only be brought about by powerful others."*
>
> *(Kollmuss, et al., 2002 p. 243)*

While the cognitive model focuses on changing mindsets and the way we think about things, the context model takes into account that the human mind takes short cuts and often makes decisions based on heuristics amongst others (Ariely, 2009). The context model focuses on changing the contexts, which again influences behaviour in order to arrive at the intended result (Dolan, et al., 2010).

In order to remove barriers, there are a number of tools that can be used. The meta-analysis by Osbaldiston, et al., (2012) on pro-environmental behaviour experiments found that no one method is effective across all pro-environmental behaviours; instead, the treatment needs to be matched to the behaviour in order to get positive results. There are ten treatments grouped in four sets:

- Convenience, by making it easy and using prompts
- Information, through instructions and justifications
- Monitoring, by giving feedback, incentives, and rewards
- Social-psychological processes, by modelling, getting commitment, and setting goals

This analysis also emphasizes the importance of measuring results of environmental impact and not just of changed behavior (Osbaldiston, et al., 2012). This is particularly relevant, in times, where money is being put into different public projects, which are meant to make citizens act more sustainable.

Convenience

As such, people have good intentions, yet often, these intentions conflict with desires for comfort and convenience, e.g. it can be more tempting to take the car in wintertime instead of standing at a bus stop or taking the bicycle. In these cases people might have a genuine wish to be sustainable but as the situation makes it inconvenient people will stick to their ingrained routines (McKenzie-Mohr (1)).

People want to be in flow and therefore solutions need to be convenient. Lack of salience may lead to complaints and frustrations with consumers (Dolan, et al., 2010). Therefore, when attempting to change behavior it has to be an easy choice to make. This can be done by changing the contexts, e.g. the municipality of Copenhagen wants more people to cycle around town to minimize the number of cars in the city. In order to make this choice easier for people, the municipality has built broader bicycle lanes to minimize the challenges with overcrowded bicycle lanes making it easier for bicycles altogether (Larsen, 2015 (2)).

Prompts can also be an efficient way to engage people in certain behaviour by reminding people to act. This can be done through slogans and effective visuals. In order to make prompts effective "they need to be delivered near the desired behaviour" (McKenzie-Mohr (2)).

Information

Changing knowledge and creating awareness is a way to inform people about environmental problems and how they can take action. It is about creating effective messages that people understand and can relate to. However, information on its own is seldom enough when promoting sustainable behaviour. Various attempts have been made to encourage sustainable behaviour, e.g. through information-based campaigns, but they do not always have the desired effect compared to the cost of the campaign (McKenzie-Mohr (1)).

In his research within Danish schools Jensen (2002) suggests that there are two different landscapes of knowledge; knowledge about the environmental footprint, which is not sufficient, and action-oriented knowledge; thus, to create real change students need to be thought action-oriented knowledge, i.e. knowledge about effects, root causes, strategies for change and how to develop visions (Jensen, 2002).

Monitoring

Incentives can be used to encourage humans to act in a certain way as they "are shaped by predictable mental shortcuts such as strongly avoiding losses" (Dolan, et al., 2010). For instance, the Danish bottle recycling system gives people a monetary incentive to gather and return cans and bottles instead of throwing them out.

Social-psychological processes

Factors as identity, status, and social inclusion also have an impact on our behaviour. We are social animals and we often do what other people do; therefore, normative information about other people's social practices help us adapt to situations and may lead to change in behaviour (Steg, et al., 2013). To illustrate, the Danish Royal Family usually acts as a mirror for Danes in terms of social norms and ideal behaviour. Further, informing people about the norms of the population majority may help them rethink their behaviour and motivate change; thus, people want to be part of the norm (McKenzie-Mohr (3)).

Commitment and goal setting may encourage behavioural change. One example is the project _2100.nu_ carried out from 2010 to 2011 where the neighbourhood of Østerbro in Copenhagen worked together to reduce its CO2 emissions by 10%. This was done by involving citizens, shops, and housing associations, giving them free professional energy consulting and involving them in awareness-promoting events and innovation processes. By getting community commitment the project managed to reach its goal within a year (HOFOR (2)).

3.3.2 *Consumer-Based Social Marketing Model*

The Consumer-Based Social Marketing model (CBSM) is offset by the assumption that working with people's behaviour fosters sustainable behaviour, thereby reducing energy consumption. The model "draws heavily on research in social psychology, which indicates that initiatives to promote behaviour change are often most effective when they are carried out at the community level and involve direct contact with people" (McKenzie-Mohr (4)).

The CBSM-model outlines five distinctive steps to foster sustainable behaviour. It can be used by organizations as well as communities to help them make transitions towards a more sustainable future. Some or all of the above mentioned treatments can be used in the development of a behavioural design strategy. The model works in the sense that you identify the barriers and benefits behavioural change (McKenzie-Mohr (4)).

Select Behaviour → Identify barriers and benefits → Develop design strategy → Pilot with small segment → Evaluate

It starts with finding the behaviour and works backwards in order to select a strategy for changing behaviour and as such, it has shown to be successful in breaching the gap between awareness and action (Kollmuss, et al., 2002).

3.4 Propositions

Concluding the literature review, I propose that:

1. Nudges offered at the beginning of the laundry process will lower the washing detergent dose used.
2. Information about sustainable laundry behaviour along with stain removal remedies can change the choice of washing temperature.

4. METHODOLOGY

In this I will walk you through the different aspects of my research and assess the quality of it.

4.1 Research Strategy

Doing laundry has to do with habits, norms, and perceptions of cleanliness, and as a researcher my about inquiring into the subject of the customer care phase of clothes' PLC is to gather information from different angles as a sense-making process in order to test whether these practices can be influenced. My main assumption is, that if I understand what happens in the customer care phase and why, it will be possible to influence these areas in order to influence laundry behaviour in a more sustainable way.

The research was conducted using a mixed research method. This method enables the use of both quantitative and qualitative research. The reason for using a mixed method is to give a deeper insight into the challenges consumers face in the customer care phase of clothing's plc and understanding the problem from different angles in order to answer the research question then either a quantitative or qualitative method would do on its own.

Furthermore the mixed method was used to build a bridge from one phase of the study to another. Exploring qualitatively through observation alongside the answers from the *survey 1*, helped me to develop nudges, information boards and make other changes to the laundry room. These changes were followed by *survey 2* in order to evaluate the changes made and the resident's experience of the changes, held up against the detergent levels and actual washing behaviour.

The mixed method allowed me, to arrive at a somewhat complete account of the changes that happen, when nudging are used, then what I would have achieved if I had used either quantitative or qualitative research, by itself. Also intended behaviour and actual behaviour do not always go hand in hand and therefore I wanted to attack the problem from different angles in order to keep an open mind.

Furthermore I needed quantitative data in order to find out if nudges and information had changed behaviour. For this I measured the level of detergent each week held up against the number of washes during the same period. In order to measure whether the information about the benefits of washing at 30°C had any effect on the number of 30°C being chosen, a record of the washing programmes was logged and held up against when changes had been made.

Traditionally there is a division between quantitative and qualitative research strategies. But in recent in years the mixed research method has become increasingly

popular and has gained acceptance within the social science. First of all the research in this thesis is made up of participant observation within the laundry room in order to determine problem areas. Secondly, I carried out a two step survey among the residents at the dorm *Kollegiet Sofiegården* (n=40), following this I conducted a quasi-experiment, where different interventions were tested. Thirdly, I interviewed residents with follow up questions that had come to my attention after both surveys had been handed in. Lastly I conducted interviews with representatives from the areas of interest. Hanna Løyte from the industry organization SPT and Sebastian Borum Olsen behavioural designer with focus on energy and resources at KL7.

This mix of both qualitative and quantitative research designs is intended to create triangulation. Triangulation is a means of "using more than one method or source of data in a study of a social phenomena" (Bryman, 2012 p. 392) and uses "different kinds of measures or perspectives in order to increase the confidence in the accuracy of observations" (Easterby-Smith, et al., 2008 p. 334) As such it is a means of substantiating the findings if the methods lead to the same result, thereby raising the internal validity.

Furthermore, as I was a resident I was also a part of the quasi-experiment myself. So in order to avoid being bias towards my findings I also conducted two semi-structured interviews in order to determine whether my assumptions of the behaviour is right or whether my conclusions.

4.2 Research Theory

There are a number of different theories and models on behaviour and behaviour change. The theories that make up the basis for this research comes from behavioural economics including nudge theory and CBSM which focuses on removing the barriers that prevent people from behaving more sustainable, while also promoting benefits of changing behavior, whilst working at a community based level in order to foster sustainable behaviour.

As these theory make up the basis for the quasi-experiment, it will take up a substantial space in the literature review.

4.3 Data Collection

Through 2-step surveys with residents in the dorm *Kollegiet Sofiegården* the aim is to gather quantitative data about, laundry behaviour, lifestyle choices regarding washing and disposal of clothing along with general concerns about the environment, in order to understand basic presumptions and notions about the customer care phase of clothes plc curve. In order to determine whether there had been a change over a two month

period many of the questions were repeated in the second survey and were supplemented with new questions that had come to my attention within this time frame.

Furthermore, I made use of data on detergent levels used, conducting weekly measurements both before and after implementing the nudge. This was carried out over a five month period, from the end of November 2014 to the end of April 2015. In the same timeframe registration of washing data was also carried out over the 11 washing program there are on the washing machines. This included information on washing programs for the individual apartments along with the number of forgotten bookings. In this situation the data was hard to recover and therefore I did not register the prewashes; hence, there would be too much insecurity about the registration. This also means that there is a small margin of error, which might influence the findings. Registering the data under the individual apartments was time consuming, but this gave me the insight into the different washing data on an individual level that later helped me choose the residents who I wanted to interview.

In terms of qualitative data, I made use of observations both before and after the changes had been made to the washroom. Semi-structured interviews were made post survey in order to get a deeper insight into why certain behaviour was carried out.

Furthermore, post-experiment, expert interviews were carried out to analyze the behaviour and the challenges I had met in my project.

4.4 Secondary Data

The secondary data used in this thesis has come from a number of sources. As behavioural economics has gained a lot of interest by governments and public organizations there are numerous models and frameworks to use. Even though some of the texts were not intended for public use there are still a number of things that can be taken and used as the changes I wanted to do were in the interest of a larger number of people and for the greater good.

Secondary data on washing behaviour was also used, taken from the A.I.S.E report that relies on data gathered on only 200 participants in Denmark. This was the most thorough analysis of washing behaviour that could be obtained at the present time. This of course gives certain risks, as 200 people cannot be seen as representative of the Danish public as a whole.

4.5 Data Analysis

The data was analysed using the data analysis tool in Excel. Due to the nature of the sample I determined that Excel would be sufficient to analyse the data. As opposed to SPSS, Excel does not calculate significance, and without running a test for significance, I

am not able to infer the same correlation to the rest of the population from where the sample is taken from. Due to the fact that the survey sample was small, I assessed that running test for significance would not be necessary as the sample is not big enough to generalize about the greater population. This means that I am only able to apply my findings to those who completed the survey.

As I had access to the washing data for all the washing programs, it is possible, to look at the whole of the dorm an analyse, whether the nudge had an effect on the detergent level and whether the information had raised the number of 30°C and general changes in washing behaviour. This data has been analysed on both an aggregated level and an individual level.

The data gathered on detergent levels and washing behaviour is analyzed on an aggregated level and takes a look at the overall behaviour of the residents at the dorm. The survey results are analysed at an aggregated level to find out whether there is a link between attitudes and behaviour. This information is then used, to source out potential respondents for the semi-structured interviews. These interviews will be used to analyse behaviour on an individual level in order to get a better insight into laundry practices and make short portraits of these residents.

4.6 Validity and Reliability

When it comes to quasi-experiments there are elements that differ from true experiments in terms of control and therefore whether the results are caused by the treatment or whether there can be other causes can be questioned. According to Campbell et al. (1999) there are a number of validity treats towards quasi-experiments.

Experiments and quasi-experiments deal with both internal and external validity. Internal validity has to do with whether the treatment given has made a difference and whether there can be made rival hypnotises. The quasi-experiment took place from the end of November 2014 to end April 2015. In this period there is a Christmas vacation and an exam period, which may have show in the results of the washing programs, as many residents are not at home over the holidays and may give lower priority to laundry while studying for exams.

External validity has to do with whether the results obtained can be generalized to a wider population.

The quasi-experiment took place at the dorm, where I live, and most of the residents are students. Therefore it is not possible to generalize to the broader population. Also, it is not possible to generalize about students, as not all students live in dorms with communal laundry facilities. In terms of treatment in relation to the survey results, I decided to run a competition in order motivate and gain as many answers as possible.

Therefore, it cannot be denied that this may have affected the answer that participants gave and their motivation for joining in, as the potential for winning movie tickets might have prompted participants to quickly fill in the survey, in order to win.

There are margins of error in this study. First of all there are the tools used for measuring the level of detergent. These could be better and more precise. Furthermore the data on washing programs were typed by hand in Excel. These were made up of 4244 individual washing programs, done over the period of 24 week. The fact that this was done manually, leaves the risk of errors being done in the process.

According to Bryman (2012) Triangulation is when you either test qualitative research with quantitative data or test quantitative research with qualitative data. In this research I made use of semi-structured interviews to reinforce the questionnaire findings.

Validity within research is concerned with whether you are measuring what you want to measure and whether these findings can be generalized to the broader population. In other words are the findings reprehensive of the population as a whole. The sample in this research is taken from a dorm, where there is an overweight of students and therefore the results cannot be seen as representative of the population as a whole.

The changes made, were based on observations made in the laundry room along with participant observations, while doing my own laundry. Therefore it is relevant to raise the question of validity as people's behaviour is subjectively interpreted by the observer.

Certain observations might have multiple meanings and the way in which I choose to interpret them to support my hypotheses i.e. is the time that people spend in the laundry room a expression of unpleasantness of the room, or lack of time or is it simply that doing laundry is an uninteresting a task that just needs to get over and done with? Furthermore can I be sure that the periods that I spent in the washroom were representative and can my presence have influenced behaviour in any way.

Reliability concerns the accuracy in the measurements. Furthermore, I kept questions simple, in order to make sure that the questions were understood correctly, I ran a test run with a few people and asked them whether they found the questions easy to understand. Here I they confirmed that the questions were easily understood and therefore there ought to be reliability in the measurements.

The survey was based on a self completion questionnaire. This relies on participants understanding the questions, and that they answer truthfully to the best of their abilities. As such, when I designed the questionnaire I focused on questions, which would help me answer my research questions as well as giving participant's multiple options to choose from, when answering the questions. Furthermore, I gave respondents the opportunity to write comments at the end of the survey.

Short semi-structured interviews were used to get answers to questions that I was left with after most of the research had been done. In terms of interviews, these also rely on participants understanding the questions and there is also the risk that they answer what they think the interviewer wants to hear or are embarrassed about answering truthfully i.e. answering how they judge whether their clothes are dirty, they might feel uncomfortable about telling that they smell them and judge by the odour.

4.7 Research Quality

In addition, the fact that I have conducted this experiment actively and on an open basis, i.e. by attending resident meetings, making a two step survey where I also explain the context, making interviews with residents and talking to several residents during the course of the project, may have influenced the behaviour of residents and ultimately the gathered data. However, for me as an embedded resident and because of the management structure at the dorm, it was in essence very difficult to conduct a nudging experiment without communicating the project idea, scope, and interventions to the survey population and sample; thus, the population might have acted differently because of my presence.

5. RESEARCH DESIGN AND PROCESS

"Everyone designs who devises courses of action aimed at changing existing situations into preferred ones. The intellectual activity that produces material artefacts is no different fundamentally from the one that prescribes remedies for a sick patient or the one that devises a new sales plan for a company or a social welfare policy for a state."

(Simon, 1996 p. 111)

The method for the quasi-experiment can be seen as a problem-based, hands-on iterative process of experimentation, prototyping, and testing. The purpose of this was to test different tools and apply design knowledge and skills in a specific area. As such, this deviates from a more traditional method, where there is a clear line of testing to begin with. This is due to the fact that problems occurred simultaneously with the collecting of data, and hence gave new opportunities to test out what worked for changing behaviour.

In this case there are elements taken from classical experimental design. This is due to the fact that there was pretesting in the shape of a baseline period, where washing powder was measured and logged, in order to determine the level of consumption without any intervention. Because of time limitations this was carried out over a 5 week period, where measurements were made every week. These results were measured up against a period, where nudges were used to compare.

When studying washing behaviour there are a number of research methods that can be used. To get an insight into the group of participants I used a number of different methods. There are different approaches to changing behaviour. Information – based campaigns have long been used by government and other organizations to change behaviour, i.e. Rådet for Sikker Trafik campaigns on the danger of driving whist talking on the mobile.

Following the CBSM-model, I will develop a strategy for changing the behaviour and use tools from the social sciences, such as prompting, information provision, and promoting sustainable behaviour.

The first part of this process was to gather information on barriers towards sustainable behaviour, along with identifying opportunities for eliminating these barriers.

The second part of the project was to change the environment in which laundry is done and prompt residents to act more sustainable in the way they treat their clothing in the laundry phase and measuring their behaviour and attitudes.

Four methods were used to get an insight into the test group; participant observations in the laundry room, a two-step self completion questionnaire handed out in residents post-boxes, priming at residents meetings and semi-structured interview.

Participant Observation and Emphatic Design

For the research method I partly made use of ethnography as I was a participant observer, observing different behaviours in the laundry room.

In order to gather information and inspiration to how to change the behaviour, I made use of participant observation in the *initial phase* to gather information on the improvements that could be made in the washroom. As I myself had used the laundry room for many years I had experience in what was missing. I had previously dosed by eye and the instructions given and experienced soap residues in my clothes, but instead of questioning my own behaviour and the washing instructions I had concluded that it must be the age and ineffectiveness of the washing machines. Furthermore I tested different programs and washing powders, in order to determine whether the washing advice I was giving my fellow residents did in fact get the desired results.

The design of the laundry room, the nudge and information displayed was partly inspired by emphatic design techniques. The main assumptions in this technique is that people cannot ask for what they do not know, and therefore trained observers go in and observe actions and behaviour and this interrupts the action less then inquiry does. (Leonard, et al., 1997)

As such, I was not a trained observer, but it allowed me to get an insight into the behaviours of others.

Survey

The survey was made up of two steps, with two months separation. My initial reason for this was, to find out whether there would be either a change in attitude or perceived behaviour within the survey group. Therefore it was important for me to get as many on board as possible from the start, in order to get as many to get as large survey group as possible. Only residents, who answered survey 1, were asked to participate in survey 2.

A paper-and-pencil survey was chosen for both survey rounds in order to be able to trace each participant to the next level as well as the actual choices of washing programs chosen when washing. Hence before handing out the survey, I marked them with apartment number, in order to trace the individual behaviour. Furthermore I had the hope that an actual paper form in the residents post-box would get more people to fill in the for survey as opposed to making a link on the common Facebook profile, that the dorm uses for communication. This choice also carries the risk that people forget to either fill it out, hand it in, or simply that the survey gets lost among letters and never gets read.

In order to motivate residents to fill in the survey, I wrote a covering letter, informing people about the problem with overdosing of detergent, and my reasons for sending out this survey and that I would appreciate their help by filling in the survey. Furthermore

residents were informed, that this was one out of two surveys and that the collected data would solely be used for statistical purposes and would be 100% anonymized in the final report. A similar follow letter was attached to survey 2. In a hope to increase the number of participants I ran a draw, where everyone who participated in both steps of the survey would take part in the draw for cinema tickets, wine, and chocolate. The winners were drawn in February 2015.

The first survey was made up of 42 questions, made up of closed questions about laundry habits and choices as well as statements concerning attitudes and values in connection with sustainability and laundry. At the end of the survey participants had the option of writing Comments, criticism and praise. In survey 2 some general questions were taken out, some were repeated and additional questions were added asking participants to evaluate the overall changes made to the room.

Survey 1 was handed out to all 156 apartments. The kindergarten, day-care centre and restaurant were not included in the surveys, as it concerned personal washing habits and clothes care habits. The residents had 14 calendar days to fill out the survey with a deadline the 16th of December. The second was planned to be handed out ultimo January. This date was later moved to the start of February as participants were slow to hand in their answers. Reminders about handing in the surveys were posted on the official Facebook page, and in the end I had to knock on doors, which resulted in a few extra surveys.

Semi-structured Interviews
Semi-structured interviews were used to get a deeper insight into the habits and practices, of people's laundry practices. As such, these were not a part of my initial research design, but it turned out that as the quasi-experiment progressed, I found, that I needed more information about the research sample and get a deeper understanding of why I was not seeing more visible changes. Therefore I carried out semi structured interviews, three with residents and 2 experts that could give me a deeper insight into the process and what other possibilities there were.

5.1 Research Sample

In the following I will give a presentation of the research sample and setting.

The quasi-experiment was carried out in a common washing facility of a Copenhagen dormitory *Kollegiet Sofiegården*. The reason for this setting was that up to November 2014, there were considerable problems with machine stops because of detergent overdose when filling the machines. These problems led to periods where the capacity in the laundry room was lowered from four machines down to tree and sometimes even two machines, causing great annoyance to the residents and raised expenses for maintenance to the dorm as a whole. This led me to thinking, whether there were ways,

in which, residents could be nudged into dosing the right way, in order to lower the environmental damage. Als as a means to eliminate the frustrations over machines that were out of order. Furthermore I wanted to see if, by means of information and nudges, users could be nudged into lowering the temperature from 40°C to30°C.

The quasi-experiment was conducted over the course of 24 weeks, starting from the end of November 2014 to the end of April 2015.

Setting
The laundry room caters for 156 apartments, which are made up of 1, 2 and 3 room flats, a kindergarten, a day-care centre and a restaurant.

As the photos in appendix 1 illustrate, the wash room has four washing machines and two tumble driers of the Miele brand, which are connected to a *water softener* – a machine that filters water, before it enters the washing machine and removes the lime from the water in order to make it soft. With soft water running through the machines the minimum dosage of washing detergent is needed to get the clothes clean. As such it is an environmentally friendly way of filtering water, and one might conclude that matters have already been taken to make laundry at Kollegiet Sofiegården more sustainable, but only, if residents follow the instructions for dosing detergent for soft water.

Furthermore the laundry room is equipped, a table for folding clothes, and a small washing basing to wash hands. Information boards, with information about prices and functions guide and help users choose the right program to wash their clothes.

A large cylinder contains standard washing powder of the brand Neutral Compact for white wash (powder), but users also have the choice of using their own detergent. According to the package the dosage is 70ml. for a full wash (7.5 kilograms) and 50ml. for half a wash (4 kilograms) when washing with soft water.

Sample
The sample was first and foremost selected from the criteria of availability. The setting would allow me to make changes to the environment, give easy access to information on selected washing programs whilst giving me an opportunity to observe at any given time and allowing me to add new initiatives I found fitting.

Furthermore young students represent a group of people that are met with the challenges of doing laundry for themselves. For some students, the dorm represents their first home away from their parents and this means that they have to do their laundry for themselves. Some may take their laundry habits with them from their parents, while others may be left to their own devices, without having a real interest about the matter. In this sense informing and nudging young students to do laundry more sustainably, can have great potential to change behaviour in the long run.

Furthermore students also represent a group of individuals, who are well educated and used to processing new and complicated information on a daily basis. Therefore my assumption was that this group of people could be influenced with rational and objective information about sustainable laundry habits.

The survey participants voluntarily chose to participate in the survey, and as such, I had no control this group. After both surveys ad been handed in I eliminated one participant, as he did not do his laundry at the dorm. Although he did partake in the draw, as he lived up to the criteria of handing in both surveys. Participants were chosen, because I had seen them, carry out practices, which I wanted to get a deeper insight into.

Baseline Period
In the start of the study I carried out a baseline phase of four weeks, where the washing powder was measured every week and compared to the amount of washing loads being processes. Week five has also been included in the baseline period, as during this week the only changes made in the room was that I painted it. On the last day of week five the different initiatives were put in place.

Field Research
Being part of the experiment, I conducted field research with the different washing programs. Gaining insight into the quality of the 30°C programs and experimenting with how many kilos of clothing the program could manage before it influenced the result of the clothing. This knowledge was used to gain insight into processes and to help nudge the residents into washing more sustainable.

In this process I also realized the challenge of dosing correctly. The first time I had to follow the dosage instructions, I felt the urge to put extra washing powder in with my laundry. The thought that it would give me cleaner clothes did strike me, but in the end I chose to follow the instructions and to my own surprise my clothes did turn out clean. This experience gave me the extra confidence that what I was advising my fellow residents actually worked.

In this sense, I did active research participating as opposed to doing objective observation as well being an active participant at the monthly residents meeting.

Besides testing the different washing programs available and testing the washing advice, that I had displaced e.g. airing my jeans instead of washing them and lowering my 40°C washes to 30°C. This was both out of curiosity and to make sure that what I was advising others to do, would actually work e.g. I wanted to know if clothes can become clean at 30°C. At the same time my habits were as much in need of being changed as the rest of the residents, as I was accustomed to washing at 40°C and 60°C.

__Residents Meetings__

In the CBSM-theory, it is emphasized to build community support in making a positive impact in terms of sustainability. This can be done either through persuasion, communicating norms, such as the percentage of citizens, who participate in sustainable behaviour, or simply to create awareness about the problems at hand and a suggested solution (McKenzie-Mohr (3)). In this study, living in a community, like a dorm, meant that I had the opportunity to influence residents at the monthly residents' meetings, where small as well as large subjects, were up for discussions. Although, there were usually only between 7-15 participants at these meetings, I used the opportunity to talk about sustainable washing habits and the changes I wanted to make in order to promote sustainable washing habits. This was in order to prime residents into thinking about the choices, they make, when washing clothes. Also these meetings were used to present proposals which were democratically voted for. Painting and interior changes to the room was arranged with the staff and was only presented to residents and did not need an official vote.

At three meetings, I got support to;

- Change the fine for not showing up late for a booking.
- Change the prices of the washing programs in order to get more differentiated prices that reflected the actual energy and water use.
- Convert one of the common areas into a drying room, in order to give residents an alternative to using the tumble drier.

Although booking fees and drying room lies outside the scope and timeline of my thesis, I have included it, as it is part of the experiences and challenges in connection. The interest in a drying room gives an indication that there is an interest in drying clothes in other ways then the tumble dryer, either because residents want to be more sustainable, or because they want to take better care of their clothes.

5.2 Research Project Overview

Below in figure 1 is illustrated a time line for the project, involving six different stages. Originally the process was intended to involve four stages, with one distinct intervention, but as the project progressed opportunities, identified at the analysis phase, gave rise to two additional ancillary-interventions that needed to be explored.

In the following I will give an account of the six stages, what actions were taken, data gathered and the processing and analysis that was done going from one stage to the next. This is illustrated with a dotted line going from the analysis phase, in the previous phase, to the action phase in the next stage.

Trough all six stages "Processing" was done by registering and structuring the data on chosen washing programs, detergent levels along with survey results in Excel spread sheets.
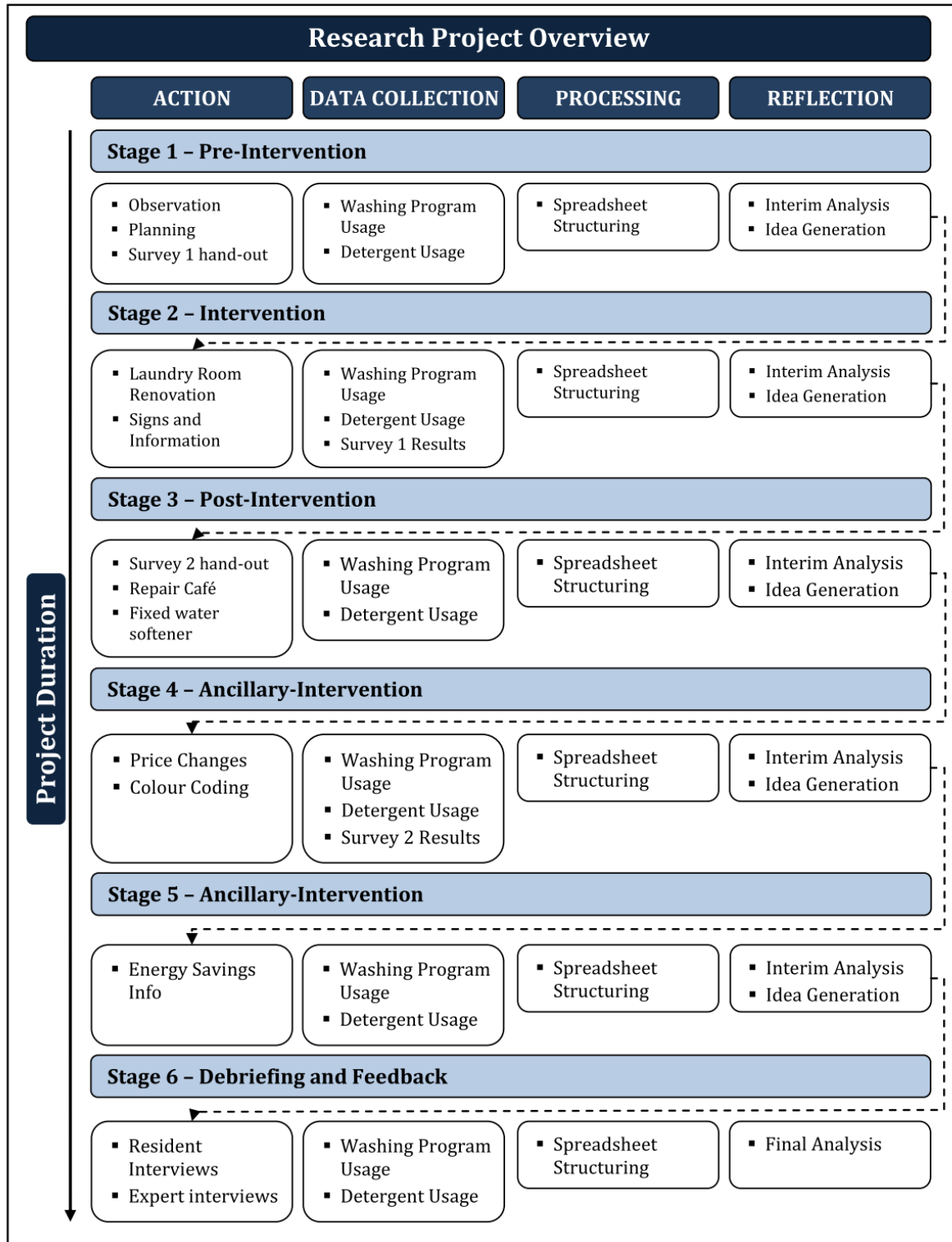
__Timeframe__

The period in which the research was carried out was originally planned to run over the course of 1 to 3 months, but opportunities to try further tools meant that this period was prolonged to 5 months.

These 5 months were made up of a number of milestones and timeframes:

- Observation and sense making (ongoing process from 1th Nov. 2014 to 16th Apr. 2015)
- Survey 1 (hand in date 16th of Dec. 2014)
- Redesign and painting of the laundry room (16th -22nd Dec. 2014)
- Design of information and dosage manuals (by 22th of Dec. 2014)
- Survey 2(hand in date 14th Feb. 2015)
- Price changes (2nd March)
- Further signs to nudge people to lower temperatures (30th March 2015)

5.2.1 Stage 1 - Pre-Intervention

This stage started the 17th of November and four weeks until the 15th of December 2014.This stage acted as a baseline period, where I had to observe and measure what was going on in the process of doing laundry. This stage was used as a sense making process around laundry habits; observing what was going on in the laundry room and looking for opportunities to change behaviour. I spent four weeks observing behaviour and conducting weekly measurements of detergent levels without any interventions or changes in the environment. The fifth week was used to paint the room and the data from this week has been included into the baseline data, as there were no interventions as such, only me painting.

__Evaluating the setting and planning__

As the pictures in appendix 1 show the laundry room appears dark and messy. Beneath are listed the factors that I felt made the room an unwelcoming:

- Purple notice boards took up a large part of the perceived space, which was filled with different posters that acted as manuals for the machines, but which did not make much sense for me as a reader,
- Old posters fixed to the wall with Plexiglas and nails,
- Wash carts with wheels – some of them with wheels that did not work or were missing,
- Wooden worktop for folding clothes, which was worn,
- A second notice board, blue, where information was displayed casually and without organization,
- A soap bucket with a torn dosage manual that was hardly noticeable,
- Forgotten laundry scattered around,

- A bucket for clothes that had been forgotten or left behind,
- Detergent on the tops of the washing machines.

Observations

My observations would often take place when I was doing my own laundry. I would sit and observe others doing their laundry and afterwards log what I had observed. I often observed users take two of the pink fillers (50 ml each) with a top from the detergent cylinder and fill them in the soap dispenser on the machine. This would often leave a trail of detergent on the floor and on the top of the washing machines. As the laundry room is only cleaned once a week the "powder" trails would become quite apparent as the week progressed.

Also, I observed users dose detergent for a full wash, even though they had only filled half the machine. Many instances, where the machine was half full some would choose a full wash on 40°C, even though there is an option for 40°C with a ½ load. This meant that users would use approximately 20% more water and energy, than if they had chosen to wash ½load at 40°C, as well as using excess detergent. Washing detergent is at user's free disposal and there is no regulation. The cost is factored into the price of a wash.

Also it seemed the laundry room was a place of task completion and not a room people stayed in for long. I never observed people occupying the room without doing some activity linked to the laundry process. If people were too early collecting their washing, they would either stand or sit on the table and watch the countdown of the machine or check their phones.

Data Collection, Processing, and Reflection

The observations allowed me to develop survey 1 and design a better layout for the laundry room. Survey 1 was made up of questions and general wondering that observations could not give me an insight into. Furthermore I wanted to get an insight into user's attitudes towards sustainability and other general attitudes concerning clothes care and disposal of clothing.

Whilst researching the laundry room, it came to my attention that the information on dossing detergent was misleading and wrong. The dosage instructions were for a detergent that was no longer being used.

This data gathered through my observations, were noted in a logbook and data entered and processed in Excel in order to structure my findings. The interim analysis was used to compare the level of detergent with the number of washing programs run in the same period.

Data on the washing programs was taken from an internal system from Miele Professional, where washing data was gathered under each apartment number. While

this data collection turned out to be a time costly process, it was the only way that I could collect factual data on washing behaviour.

Furthermore measuring the detergent levels on a weekly basis, compared with the number of washing programs run on the four machines in the same timeframe, shoved that there was an average excess use of detergent of approximately 10-20ml during the baseline period.

5.2.2 Stage 2 - Intervention -Design of the Washing Room

"important distinction is that environments are frameworks of activities, significantly affecting patterns of use, behavior, and expectations in home life, work, leisure, and a range of commercial ventures."

(John Heskett 2009 p. 68)

Renovation and design of the laundry room
Following this view, the laundry room works as the framework of doing laundry and as such it lived up to this function. But in essence I wanted to create more flow in the washing process, in order to create salience in order to make people dose detergent correctly.

With the knowledge from stage 1, I spent a week painting and refurbishing the laundry room and making signs to help improve the environment and guidelines that people could follow. Shining up the room and heightening the standard was a means of making the room more attractive and in this way, it might have had an indirect effect, on people actually being able to clearly reed the dosage instructions. There were two areas, where I wanted to make an impact; dosage of washing detergent and lowering the temperature to 30°C.

When deciding on the design of the room, there were certain restraints within the space. First of all there was the placement of the washing machines and tumble dryers and a large press that contains a water softening system. Furthermore there were some financial restraints, in terms of what I could do.

As the assumption is, that many consider laundry to be a chore among many over the course of a day or week; a chore that is done without much consideration or thought. This was also reflected in some of the behaviour I observed in the laundry room. People would quickly load their laundry, fill detergent, put their pay card in the machine and choose the preferred temperature, press on, and in less than 5 minutes go out the door again.

The washing machines were estimated to be quite old between 10-15 years but it was not possible to obtain the correct data to confirm this. Therefore, there are not many

options to wash environmentally friendly. Alas, there are program for 95°C, 60°C, 40°C and 30°C furthermore there is a program for ½ load at 40°C

When designing the environment for doing laundry, I took into account the use of the room and put great importance into creating salience, both in the layout and the information given. The detergent cylinder was moved, allowing room for two wall chairs, that were mounted on the wall alongside a magazine shelf in order to create a space where users could read and relax while waiting for their washing cycle to end (see appendix 3).

Information
One needs to make prompts and information noticeable, self-explanatory, captivating and "presented as close in time and space as possible to the targeted." (McKenzie-Mohr (2)).

When designing the information and signs, I emphasized making it didactic and colour-coded with catchy headlines. Spray bottles in two different colours, a poster guided in a fun and inviting way, newspaper articles with sources, real stories and actors, and objective facts, and advice, slogans like "Keep it clean, guys" and "30 is the new 40", attended residents' meetings, where I have promoted my case (see appendix 4-8).

In terms of dosing correctly, there were two areas, where I wanted to make an impact, the information about the detergent and the correct way to dosage.

Dosage instructions
As I had found out in the previous stage, the dosing instructions were wrong. Therefore, I research on the right amount of detergent.

As the laundry room was equipped with a water softening system, it was important to inform that instructions for "soft water" should be followed, especially for those, who did not uses the dorms detergent. Furthermore, it was stated that clothes do not get cleaner by using more detergent and that soap residues are left in the clothes if you overdose.

The dosage signs were put up at the cylinder with washing powder in eyesight level making it hard for users to ignore (see appendix 4).

The information was presented in easy and understandable way, in both English and Danish and the layout was catchy and colourful.

Nudges
Dosage instruction that was intended to act as nudge was placed in the soap dispenser compartment (see appendix 5). When opening this compartment the user was met with a picture of the measuring cup showing the right amount of detergent needed for both a half and a full wash (see appendix 5). The drawings with measuring cup were intended

to work as a visual cue to stop and think about the act of dosing detergent. They featured less text then the dosage instruction, by the detergent cylinder, in order to work as a nudge, just before washing powder is filled into the machine. Information also informed users that did not use the dorms detergent to measure according soft water.

The idea of the nudge is to make the process of dosing intuitive as opposed user having to read instructions every time they did laundry which puts strain on the user's reflective system. A light bulb indicates that there is information that more detergent doesn't make cleaner clothes.

In my view, this sign qualifies as a nudge, as it changes people's behaviour in a way, without limiting the choice and without adding economic incentives.

New Measuring Cups
In order to make it easier to dose correctly, new measuring cups were provided. These cups were clearly marked with 10, 20, 30, 40, and 50 ml. this was intended to make the user more conscious of how much washing powder they were using and able to dose according to the nudge.

Articles
Whilst researching about sustainable laundry habits, I found insightful newspaper articles with real stories, objective facts and advice about clothes washing.

Article 1, Levi's CEO Explains "Why Jeans Should Never Go In The Washing Machine", is an article, referring to Levi's CEO, Chip Berg, who has stated that he does not wash his jeans in order to save water, and also to make them last longer (Bergh, 2014).

I felt that this article had a strong message, as it referred to a CEO from the clothing industry. Also most of us have a pair of jeans in our wardrobe and can relate to wanting them to last and look good longer. Furthermore the article states that after two years a pair of jeans that has been washed once a week, consumes roughly 3500 litters of water, the equivalence of 6700 glasses of drinking water. This picture of 6700 glasses of water would hopefully be easy for people to remember.

In article 2 "Vi vasker for meget og forkert" hygiene expert Michael Rene from Metropol, talks about the mistakes that people make when doing laundry. Here he states that the most common mistakes when dong laundry are; thinking that more detergent means cleaner clothes, and that people wash clothes that are only semi-dirty. Furthermore he gives advice on washing temperature. Which is simply to wash clothes at low temperatures accept for underwear, which should be washed at 60°C. The important thing to remember is to use a detergent that is designed for cold washes (Kristiansen, 2014).

Article 3, "'Rent' tøj fyldt med farlige bakterier" informs readers about the risk of washing underwear together with the rest of your clothing as bacteria are not killed below 60°C. Furthermore it states that if you don't run a 90°C programme once in a while, you risk turning the washing machine into a home for bacteria (BNB, 2013).

Besides the articles, advice on environmentally friendly laundry was made on the basis of an article from Politiken, but changed in order to fit the washing detergent that was provided in the laundry room (see appendix 6).

These articles and the advice on environmentally friendly laundry advice were hanged on the information board, both as inspiration, but also to put some objective facts behind my initiatives.

Prompts

Prompts are effective in reminding people to engage in sustainable behaviours. The purpose of is not to change attitudes or increase motivation, but simply to remind us to engage in an action that we are already predisposed to do. (McKenzie-Mohr (2)).

I had observed that often there were soap trails left behind and I created a prompt to encourage users to clean up after themselves. Green speech bubbles saying "Keep it clean guys!" were created as an encouragement as opposed to a raised finger (see appendix 7). Two small speech bubbles were placed on the information boards above the washing machines, which were intended to be seen while dosing detergent, reminding people to clean up spilled detergent.   A large speech bubble was put on the door as to catch people's attention when leaving the room, reminding then to clean up after themselves.

Artwork

Art can be used to can be used to enhance the aesthetics of a certain space making the user experience better (Leder, et al., 2004). Therefore, I designed and framed a poster in 1950's style taking inspiration from an old detergent advertisement. This was meant as a funny way to communicate the advantages of using *Neutral for whitewash* which matches the detergent being used in the washroom today. This was both to replace the old poster and a way of making information fun and eye-catching (see appendix 8).

Stain remover station

A stain remover station was made with a sign encouraging users to lower the temperature to 30°C and the option of removing stains and odour with vinegar and stain remover in order to get a good result. Vinegar is a natural product that helps neutralize smells and the stain remover was of the brand Vanish and is marked with the Nordic Swan (H.J. Heinz Company). The two sprays were in different vibrant colours and with a colourful sign saying "Stain removal station" (see appendix 9). The advice was given that you should use the stain remover on visible stains and the vinegar to get smells out of

clothes i.e. under the armpit of the clothes. As such this can be seen as a nudge as it provides the option of lowering temperatures but without forcing people in this direction.

Data Collection, Processing, and Reflection
Survey 1 results were gathered and typed in a spread sheet in order to analyse the results. 56 residents decided to participate in the first survey.

In terms of measuring attitudes towards sustainability the majority of respondents agreed or completely agreed that they do an active effort to live sustainably. 30% neither agreed nor disagreed and 5% disagreed. At the same time 41% agreed or completely agreed with the statement: "I am conscious about washing clothes in the most sustainable way" and 43% agreed or completely agreed with the statement "I do not feel that I am sufficiently informed to be able to wash sustainably"

This meant that, there was just around 57-59% of the survey group, who could potentially be in need or want of information about sustainable washing behavior.

Whilst analyzing the data, it became apparent that the most used washing programs were 40°C and 60°C programs. Therefore, it made sense to try to promote lowering of temperature from 40°C to 30°C.

Own experience logged
I had previously experienced soap residue on my clothing, but had always concluded that it was the old machines that were the problem and had never given thought to the fact that it was due to overdosing of washing powder. Therefore, I also got to experience what some of my participants had experienced and that was how little detergent is actually needed to get clothes clean. The first time I had to wash clothes after putting up the signs I followed dosage instructions on the soap department. As I had designed and written the sign I was familiar with them and did not have to read them. After having filled the detergent compartment, I looked at the amount in the compartment and thought to myself "wow, that is not much" and for a brief second I thought to myself whether I should put a bit more in, just to be sure that my clothes would be clean. I chose to trust my own instructions and luckily I experienced that the clothes ended up clean and without soap residues. This shows that even with the right information there is still a strong drive of habits and a concern of cleanliness.

Additional considerations
Signs encouraging users to avoid the tumble dryers were opted out. This was due to the fact that the dorm does not facilitate the option of clotheslines or other means of drying clothes sustainably. Furthermore the apartments are very small, ranging from 25-65 sqm making it very hard for people to dry their clothes there. In energy use this is an area that has potential to save a lot of energy, and prolonging the life of people clothes.

Overall the laundry room was optimized in order to give a cleaner, airier and welcoming feel to it.

5.2.3 Stage 3 - Post-Intervention

In this stage survey 2 was handed out to the 56 apartments that had chosen to fill in survey 1.

Repair Café

In this period, I chose to run a repair café; this was in order to get people to become more aware of taking care of their clothing. Posters were put up in all the hall ways and laundry room, in order to create awareness of the event. The Repair café was a means of supporting the sustainability perspective and to get people to think more about prolonging the life of their clothes as opposed to throwing them out. Seven people participated. The participants had been encouraged to either bring their own project either something that needed redesign or something that needed to be repaired.

This process allowed me to get an insight into what, these participants thought of sustainability, when it comes to clothing and also how they buy clothes.

Some had only minor repairs, i.e. one guy had brought clothes that were bought in a second hand store and this was the second time, that he was mending it. He told me that he had an aunt, who volunteers at a second-hand store and that she puts things aside for him that she feels is of great quality and which she thinks he will like.

Another participant, who was pregnant, had found an old duvet and pillow covers in the dorms recycling room and wanted to make a breastfeeding pillow instead of buying a new one.

One participant had an old 1980's dress she had found in a second hand store and transformed it into a shirt.

So on some level all of the participants were all were conscious about not throwing clothes out just because they were broken. Either they would fix it or send it to a second hand store, so as such there were no real cases of behaviour that I could try and influence in a more sustainable way.

Breakdown of the water softening system

Trough researching the water softening system, it came to my attention, that the system had not been serviced since 2010. This is advised to happen at least once a year. I was concerned that this would affect the washing result that people would experience when dosing less detergent, why I made sure that I had the system serviced. Unfortunately, with the result that two weeks later the system broke down completely. This meant that for a time period of two week users were advised to dose 25 ml. more than the dosage

instructions said. It also meant that a new water softening system was installed, which means that the dorm will have a system that can work for many years to come.

Data Collection, Processing, and Reflection

In terms of data collection, no revelations were made in this timeframe. The repair café had not been fruitful in the sense that I had planned, but it was interesting to get an insight into people, that really do not go out and buy new clothes, but instead buys most of their clothes second hand.

The data collection had not revealed any large movements of 30°C washes, so I started thinking hard about why it could be that residents, who stated that they were concerned about the environment; yet, after the knowledge about sustainable laundry behaviour had been made available to them, still continued to wash at the same level and at 40°C.

5.2.4 Stage 4 - Ancillary-Intervention

> *"Design is about building on ideas, trying things out, comparing alternatives, exploring opportunities to finally select the best possible solution."*
>
> *(von Stamm, 2004)*

As such, I had come to a stage in the process, where there did not seem to be a movement in the number of 30°C washes being done. Over the course of the project, it came to my attention that the prices for washing clothes might have an influence on the programs that users chose. The prices were at a flat rate; a 30°C wash cost the same as a 60°C wash and a half 40°C wash was the same as a full wash. All washing programs cost 10 DKK accept for a 95°C that cost 5 DKK more. The spin cycle was free, even though it used electricity. This price structure meant that people, who washed at 30°C and who chose a half-40°C instead of a full 40°C, essentially were subsidising washes, that were more resourceful in water and energy. Hence there was no economic incentive to change ones washing behaviour.

According to McKenzie-Mohr "Financial incentives can provide the motivation for individuals to perform an activity that they already engage in more effectively, such as recycling, or to begin an activity that they otherwise would not perform." (McKenzie-Mohr (5)). While I could see that some users were washing at 30°C and choosing E40 (half-40°C) I wanted to motivate more people to change their behaviour.

Therefore, I worked out a new price structure that took offset in the real energy and water consumption. The price structure was sent to a vote at a residential meeting, where I also had the opportunity to give an account of why it is more sustainable for people to pay for their individual use and that the new price is meant to incentivize residents to wash more sustainably. Furthermore, I used colour coding when designing the pricelist, this was meant to give the association of the energy savings label that consumers are used to from domestic appliances.

Data Analysis, Processing, and Reflection

In this phase, survey 2 was handed in and 41 residents out of the 56 had chosen to answer survey 2. One survey was taken out, as this resident did not use the laundry room at the dorm. The results of the surveys will be summarised in findings, and discussions below.

Additional Information

About half of the participants used the opportunity to write in "Comments, criticism and praise" section at the end. Mostly these were words of praise of how the washing room looked better and a lot cleaner, there were also issues that people felt that they wanted to elaborate on.

5.2.5 Stage 5 - Ancillary-Intervention

At this stage there had not been any drastic movements in the number of 30°C washes and therefore decided, that I wanted to give it a last chance to get people to lower the temperature to 30°C. Therefore the slogan;"30°C is the new 40°C" was put up just above the button for choosing the washing programme on the washing machine. Furthermore signs informing about the energy saving, there are when you lower the temperature from 95°C to 60°C, 60°C to40°C and 40°C to 30°C, were put up on the blue information board and on the sign informing about washing programmes. The information on the sign was taken from the campaign "I prefer 30" and shows an interval of the savings level you can make (see appendix 11).

As such they are not representative of the interval of the washing machines, as it was not possible to get the right data form Miele. But still, it offers users an idea of what lowering the temperature can have in effect.

Data Collection, Processing, and Reflection

As such I met a wall in my enthusiasm as the changes I had made had not changed the majority of the user's choices in washing programmes. Furthermore, following the first few months, that laundry room had stayed clean and tidy for most days of the week, yet this was changing. Some days the laundry room was filled with loads of bags with clothes and clothes scattered around. It seemed that the slogan "Keep it clean guys!", had lost its charm. I felt that I needed more information about, why it was so hard to change behaviour and that all my efforts had been in some ways wasted. Therefore going into the next phase, I wanted to interview some experts and residents to get a deeper insight into the challenges and barriers there are, when washing sustainably.

5.2.6 Stage 6 - Debriefing and Feedback

This stage of the project was used to gather further insight into my findings, debrief the project and analyse the findings as a whole. This was mainly to get answers on why 30°C washes had not gone up to a higher level.

Also I wanted to get experts insights into why my attempt to get people to lower the temperature had not had greater effect. I wanted to know what results the campaign "Iprefer30" had achieved and whether I could take a few lessons from their research when reflecting on my own project. Also I wanted to interview someone working with behavioural change in order to find out, why it is so hard to change behaviour.

Data Collection, Processing, and Reflection

In this phase I gathered the last washing data and detergent levels. I structured the data in Excel and compared the final result, which are presented elsewhere in the thesis. Further data collection was in the form of semi-structured interviews with experts and a few residents. This helped me get further insight into my results and made it possible to evaluate the whole project.

5.3   Interview cases

In addition to the two surveys and the registration of the washing data I wanted to get a deeper insight into the barriers that prevents consumers from washing sustainably and what barriers prevent consumers from washing at 30°C.

This was done through conducting semi-structured interviews with four residents (two male and two females). The names have been altered, in order to keep their anonymity. The questions varied depending on the answers they had given in the surveys and the registered washing data.

5.3.1   Interview with SPT

Hanna Løyte, is the CEO the Danish industry association for Soap, Perfume and Chemical-Technical products, SPT. SPT has been running the campaign "I prefer 30", a campaign launched in five European countries financed by the International Association for Soaps, Detergents, and Maintenance Products, A.I.S.E., where its role has been to gather Danish partners, and run the campaign, through different PR means. The hope with the campaign was that it was to change behavior, but admits that it is easier said than done.

As an industry association, she points out that it important to get involved in such a campaign in order to take action in getting more people to wash sustainably, and as such. She points out that there are two factors that need to be in place in order for the consumer to switch to 30°C or lower; washing powder, designed to be effective at low temperatures and washing machines that can wash at low at 30°C or lower.

The main challenges of the campaign had been that their washing advice is not in accordance with other washing advice. Washing at 30°C, is a simple statement, but it is not the whole story as there are items that need to be washed at higher temperatures, in order to remove bacteria.

In terms of results, they had not measured, whether that campaign had had any influence on the behavior instead, they had measured on exposure rates. In Denmark, the population has been exposed to the message 3,3 mio. times. They have met positive response from stakeholders, such as politicians and other trade organization.

Hanna suggests that it should be a part of education that children should learn about laundry practices in home economics; thus, it also to prevent that they follow some of their parents' bad habits like washing at high temperature.

5.3.2 Interview with KL.7

Sebastian Borum Olsen is a behavioural designer at KL.7. When working with behavioural problems, they take offset in a number of models such as the EAST-model, which stands for Easy, Attractive, Social and Timed.

Through their analysis of behavioral problems, they often find that there is a lot of good will. So when people do not act as intended, there are a lot of other factors that play a part. If you meet this good will, and design towards it, then it is possible to go far in changing behavior. When talking about the challenges that I had met in trying to get people to wash more sustainable, he mentioned, that he saw numerous problems. First of all, that the producers of washing machines, have a tendency to give the consumer more and more features and programs to choose from, which is not necessarily a wish from the consumer, but in order for the producer to earn higher profits, hence a structural problem. Because as such consumers are concerned with getting their clothes clean, giving the example from his own experience he has found a program that washes his clothes clean, whether wool or other, so that is what he sticks to.

As for care labels, he points out, they are a part of an internal expert language developed by the industry, but these labels confuse the consumer, who does not understand them, or at least needs to use their reflective systems to understand them. When asked whether campaigns or education about washing behaviour in schools can help target these issues, Sebastian was quite clear: "you need to address system 2".

When asked about their projects, he stated that they are not always successful in changing behaviour, but that there is always knowledge and insight to show, even when they do not succeed in getting the preferred behaviour.

5.3.3 The Sally Case

Sally is a 27-year-old master student at Copenhagen University and lives alone. She suffers from allergies, which means that she has to use detergent labelled with the logo of the Danish Asthma and Allergy Association and cannot dry her clothes outside, which means that she always uses the tumble drier. She determines whether clothes are dirty, by looking at and smelling her clothes, in order to judge, whether the clothes need

washing. But she also uses the number of times that an item has been used, in order to judge whether it needs washing;

> *"if I have worn it more than two times, 2-3 times if it is pants, ….if it is a blouse, I have usually spilled something on it, then it goes into the laundry basket" "…underwear is always washed after one wear"*

> *(Freely translated)*

Over the course of the 24 weeks, Sally had run 79 programmes; an average of 3,3 times a week. This caught my eye as only 3 apartments managed to succeed this level in the same period. These were 3-room apartments with small children. Sally had stated in the survey, that she washed most of her clothes after wearing them once. Keeping this in mind, I asked her whether she ever spot cleaned. She did not, due to the fact that she is always spilling things on her clothes, and instead of spot cleaning, she pre-treats the spots and throws it in the laundry basket because she does not want to spend hours spot cleaning. Furthermore she states that she thoroughly sorts her clothes before washing, as previous experiences and mistakes has thought her not to take chances and as a result washes things separately.

On occasions, I had observed Sally in the laundry room with a variety of different detergents and fabric softener. As the only survey participant, who had filled in both surveys, Sally uses fabric softener. She stated that this is to avoid static electricity.

I had noticed that she on two occasions had washed at 95°C. As the Danish health authorities advices to wash at 80°C or above, when washing clothes that have blood stains or carry risk of disease on them, I wanted to know whether this was a regular occurrence or an extraordinary one.

She told me that, she washes dishcloths at 95°C in order to get rid of bacteria. This she tells be is something that she has learned at home.

In terms of temperature, Sally uses the 60°C programme when washing bed linen and towels, due to the fact that she suffers from allergies. She washes most of her clothes at 40°C because that is the temperature, that she feels gets the clothes clean, especially if there are stains on the clothes. She uses 30°C for wool and fragile items and items that are at risk of shrinking. When determining which temperature to wash her clothes at, she follows the care label, as this tell you what temperature to wash at.

At the end of the interview, I asked her to partake in a small experiment; change one of your 40°C to 30°C washes and answer 5 questions about the experience and result. This was in the form of a one sheet of paper.

Her answers can be summed up as a good experience, a part from the fact that the clothes needed an extra spin. She stated that she had gotten the same result with the

30°C as she normally does at 40°C. To the question of whether she would consider washing at 30°C in future she marked yes. But she also stated that she would continue to use the 40°C programme she stated, and wrote that if she was in a hurry and would not have time to run an extra spin. The only problem she saw with running the 30°C programme as opposed to the 40°C programme was the extra spin.

5.3.4 The Patrick Case

Patrick is a 28-year-old undergraduate student at Denmark's Technical University. He lives alone. Over the course of the quasi-experiment, Patrick had washed 27 times, an average of 1,1 times a week. Four of these washes had been 30°C washes, where two of them had been in the baseline period, so this could indicate that he had been washing at 30°C before the intervention or that he had been influenced by things I had said during a residents meeting. In survey 2 he had stated that he had not read any of the articles or laundry advice, indicating that he did not seek information about sustainable laundry practices.

The interview revealed, that Patrick determines, whether a piece of clothing should be washed, depending on how many times it has been worn. In terms of temperature Patrick washes most of his clothes at 40°C and 60°C. He cannot gather enough clothes, in order to separate clothes in different washes, so he economizes in order to save time.

> *"I just do not want to spend a lot of time doing laundry, so I just throw everything in at once"*

> *(Freely translated)*

30°C programmes is reserved for clothes that are more fragile, such as shirts. He also told me that he gets confused about the 30°C programs as there are two. He uses the C30 for shirts but does not use the D30, because it says wool in a parenthesis beneath the program. And he does not have any wool items. When asked if he ever uses the E40 (half-40°C), he answered he does not, but that now that he knows about it, he might start using it.

When asked how he dosed detergent. He said that he follows the instructions:

> *"it's helpful with a reminder, or else, I wouldn't remember to dose correctly"*

> *(Freely translated)*

When I was going through my questions and the recording device was on, Patrick gave very short answers and when the interview was over and I was not recording, the conversations turned more casual and he started to ask questions about how you get smells out of clothes especially training shoes. As such smells seems to be a big issue for Patrick, as he trains a lot and want to look and smell nice.

5.3.5 The Molly Case

Molly is a 25-year-old student at Professionshøjskolen Metropol. She lives with her boyfriend in a two room flat. Over the course of the quasi-experiment, Molly and her boyfriend had washed 47 times, an average of 1,9 times a week. These washes were divided into 7 60°C programs, 2 40°C, and 19 30°C the rest had been 18 spin programs and a rinse. Molly washes most of her clothes at 30°C and bed linen and towels at 60°C.

Molly is very conscious about looking after her clothes, and always folds it and put it back in the press after it has been worn. She always fills up the machine accept for when she washes white.

5.3.6 The William Case

William is a 32-year-old primary school teacher. He lives with his girlfriend, who is a student, in a 3 room flat. Over the course of the quasi-experiment, William and his girlfriend had washed 62 times, an average of 2,6 times a week. These washes were divided on 2 60°C programs 44, 40°C program and 12 30°C programs and 4 E40 (half-40°C) William told me that he had started washing to wash at 30°C after the changes and signs had been made to the room and on the survey he had stated that the used both the white vinegar and stain remover.

Apart from being aware of taking extra care of his favourite clothes that never go in the tumble drier, it seemed that William had a very relaxed, relationship with doing laundry. He doesn't have any specific "rules" about what he washes, at which temperatures but his description seems very casual also when it comes to dosing.

> *"I followed your instructions to start with 50/70 – but now I have become lazier, so now I use around min 60 every time, but this is also, because it is not always jammed packed, the machine. So maybe, it's not a half wash but maybe its 75% full and then I judge how much detergent should be put in"*

> *(Freely translated)*

Bed linen and towels are washed at 60°C and sometimes at 40°C. Even thought he says that he should probably wash them at 60°C. He does not know why but resonates, that;

> *"If a 40°C wash can be turned down to 30°C then you should also be able to go from 60°C to 40°C... I don't know if there is any truth in it – that's my line of thought, sometimes anyway...then I turn everything down"*

> *(Freely translated)*

This is also the reasoning behind, whether he would characterize his washing habits as sustainable, that he turns down the temperatures. As with Sally he also mentions that it is a time consuming that when washing with the 30°C as it needs an extra spin.

William had not read the articles in the laundry room and like Molly, he washes underwear at low temperatures. When asked, what he thought about the fact that some experts advise people to wash their underwear at 60°C, he was quite surprised and wanted to know if there was any other way to manage it. When asked if he thinks that this information will change his behaviour in the future, he said maybe but was not sure that he would change his habits in the future.

6. FINDINGS, DISCUSSION, AND CONCLUSIONS

In this section I present and discuss the results of my findings.

6.1 Findings

In the following I will go through the findings from the 2 surveys, and data gathered on washing programs and detergent levels. For survey results, please see appendix 12.

6.1.1 General Information

The quasi-experiment and survey concerned various areas of the laundry behaviour and general maintenance and care. Looking at the 40 residents that completed both surveys, 14 (35%) were male and 26 (65,5%) were female.

3 (7,5%) respondents had children, while the rest had not.

The majority of the participants (85%) were between 21 and 29 years old. The average age of the group is 26,5 years old. As such they are not representative of the Danish population.

6.1.2 Washing Behaviour

70% of respondents stated that they wash clothes because it is dirty or smells. 22,5% wash clothes to feel clean and groomed and 7,5% wash clothes out of routine and by habit.

In terms of frequency, 75% stated that they wash less than 1 time a week, 22,5% stated 1-2 times a week and 2,5% washes clothes more than once a week.

Underwear is averagely worn 1,1 times between washes, T-shirts/shirts are worn 2,6 times, blouses and jumpers are worn 4,4 times, pants/jeans 6,5, whilst dresses/skirts 4,5 times pr washes. These frequencies only changed marginally between survey 1 and survey 2. These findings are similar to those found by Gwozdz, et al., (2013) when researching young Swedes washing behaviour.

In terms of using fabric softener only 1 stated, that they use fabric softener and this was only sometimes. This is in key with the reasons Irma has stated, for taking fabric softener of the shelves in their stores, customers simply do not use it.

Half the participants wash clothes by hand sometimes, whilst the other half never do.

In terms of washing at 30°C 4 (10%) stated that they always wash at 30°C whilst 11 (27,5%) stated that they never wash at 30°C. I in survey 2, 4 (10%) stated that they

always wash at 30°C, 8 (20%) stated that they never wash at 30°C. This could indicate, that 3 (7,5%) of respondents had gone from never to sometimes.

In survey 1, 67,5% stated that they never use the half program (E40) yet 37,5% stated that they only sometimes fully load the washing machine. In survey 2, 24 (60%) stated that they never wash at E40, while 16 (40%) stated sometimes, this could indicate that at least 3 (7,5%) of the respondents had gone from never to sometimes.

In terms of fully loading the machine, 25 (62,5%)had stated that they always fully load the machine and 15 (37,5%) had stated sometimes. In survey 2, 27 (67.5%) had stated that they always load the machine fully, while, 12 (30%) had stated sometimes, and only 1 stated, that they never fully load the machine.

3 (7,5%) stated that they always wash with the prewash, whilst 33 (82,5%) never use this function.

6.1.3 Maintenance and Care

When it comes to the general maintenance of clothes, 32 (80%) stated that they either iron work clothes or clothes for special occasions. 8 (20%) stated that they never do.

6.1.4 Values and Attitudes

In the second part of the survey participants were asked to keep the following definition of sustainability in mind, and asked to state to which degree they agreed or disagreed in sixteen different statements.

> "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."
>
> *(UN World Commission on Environment and Development, 1987)*

These questions were repeated in the second survey, in order to find out, whether there had been any visible changes in attitudes and values.

In terms of values and attitudes towards sustainability the majority of respondents agreed, or completely agreed that they do an active effort to live sustainably. 12 (30%) neither agreed nor disagreed and 2 (5%) disagreed.

When it came to worrying about climate change 37 (92.5%) stated that they either agreed or completely agreed. Only 3 (7.5%) stated that they neither agreed nor disagreed. After two months there was no major change to these statements with only few changes.

When it came to whether they believe that people first and foremost are the cause of climate change, 34 (85%) the respondents stated that they either agreed or agreed. 6

(15%) stated that the neither agreed nor disagreed and none disagreed with the statement.

In terms of whether they believe that they can make a difference, in relation to the environment through the choices they make and the products they choose 31 (77.5%) stated that they either agreed or agreed. 4 (10%) disagreed whilst 5 (12.5%) neither agreed nor disagreed with the statement.

As such, it seems that when it comes to the environmental consequences of human consumption, there is awareness and a general worry about these issues. 26 (65%) even stated that they were willing to pay extra for sustainable products, while 9 (22,5%) neither agreed nor disagreed. In survey 2, the willingness to pay extra had gone up to 31 (77,5%), whilst 12,5% neither agreed or disagreed.

When it comes to being aware of washing clothes sustainably, 17 (42,5%) either agreed or completely agree that they are conscious about washing clothes in the most sustainable way, whilst 17 (42,5%) neither agreed nor disagreed. In survey 2, 23(57,5%) agreed or completely agree to this statement whilst 14 (35%) neither agreed or disagreed. Furthermore, 14 (35%) agreed or completely agreed with the statement "I do not feel that I am sufficiently informed to be able to wash sustainably" whilst 15 (37,5%) disagreed or strongly disagree. In survey 2, 8 (20%) completely agreed or agreed, whilst 20 (50%) disagreed or strongly disagree. These results could indicate that there has been some movement in attitudes, making the participants more informed about sustainable washing habits and making them more conscious about washing clothes sustainably.

So how do these good intentions convey into sustainable laundry behaviour?

6.1.5 Washing Frequencies

In figure 1 is shown the average number of washes done pr. day. divided into temperature. The programs A, B and C programs have been merged, as the focus is the temperature. E40 is represented by its own column, as it is a ½ washing load at 40°C. Program F is a rinsing program and G is a spinning program. As such, the different periods are not comparable as some periods are 4 weeks, while others are eight weeks. This has been compensated by calculating and presenting the average number of washing programs done pr. day.

Figure 1

Average number of Washing Cycles pr. Day	95	60	40	30	E40	F	G
1. Periode Total	1,0	8,1	11,1	5,7	1,1	0,1	0,4
2. Periode Total	1,0	7,0	9,7	4,8	0,8	0,1	0,3
3. Periode Total	0,8	7,6	11,1	4,2	1,1	0,0	0,4
4. Periode Total	0,9	6,6	9,6	5,1	1,3	0,2	0,4
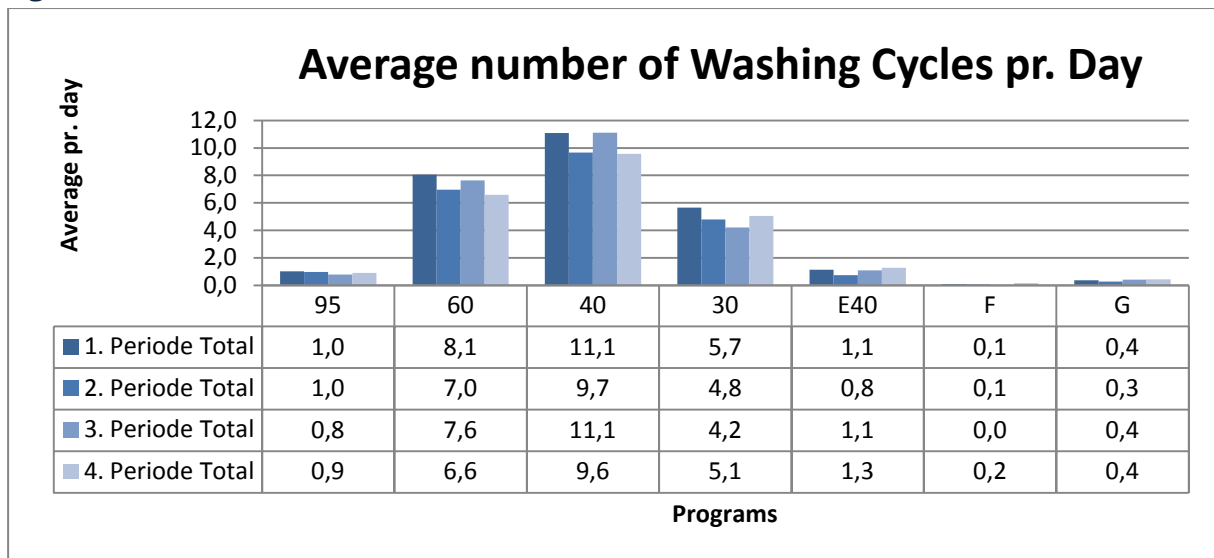
Looking at the overall number of washing programmes carried out over the course of the experiment, it is clear that temperatures 40°C and 60°C are still the most dominant programs being chosen. Although there has been a slight decrease in 60°C washes over the course of the experiment.

E40, which is 40°C with a half load, has had an increase in period 3 and 4 after the prices were lowered. This could indicate that the financial investment has had some effect.

Over the course of these 24 weeks, 6 apartments did not run a single wash, this could either indicate that they were travelling or were getting their clothes washed another place. Of the remaining 150 apartments, these washed 4244 or an average of 28,3 washing programs over the course of this period. Making the average wash pr. week 1,2 times. From the washing data I noticed that often users would group the washes together washing more than one load at a time and washing every 2nd or 3rd week. This was also confirmed by the survey, where 75% stated that they wash less than 1 time a week.

6.1.6 Detergent

In survey 1, 27 (67,5%) had stated, that they use the same detergent for all their clothes. 6 (15%) had stated that they use one for white wash and another for coloured wash and 7 (17,5%) had stated, that they use different types, depending exactly on what they intended to wash.

14 (35%) stated that they carefully measure detergent so it fits the amount of clothing that they have to wash, 25 (62,5%) stated that they dose by eye and one stated that the machine doses automatically

In Survey 2, 31 (77,5%) stated, that they use the same detergent for all their clothes, 3 (7,5%) stated that they use one for whitewash and another for coloured wash, 6 (15%) used different types depending exactly on what they intended to wash.

In terms of dosing 18 (45%) stated that they measure carefully, so it fits the amount that they have to wash, 22 (55%) stated that they measure by eye. This means that, there are 3 (7,5%), that have moved from dosing by eye to measuring carefully. This means that after a month with signs, both at the soap cylinder, and in the soap compartment people were still dosing by eye.

In figure 2 is shown the detergent levels over the course of the quasi-experiment. These are the weekly detergent levels divided by the number of washing programs run in the same period. Program F is a rinsing program, and G is a spinning program, and have both been taken out of the equation, as these do not require any detergent. As program E40 is half a washing load, and needs only 50ml. as opposed to 70ml. of detergent pr. load these washes have been divided by 5/7 as to give a more correct picture of the trend.

Figure 2

Detergent Consumption pr. Wash (ml)
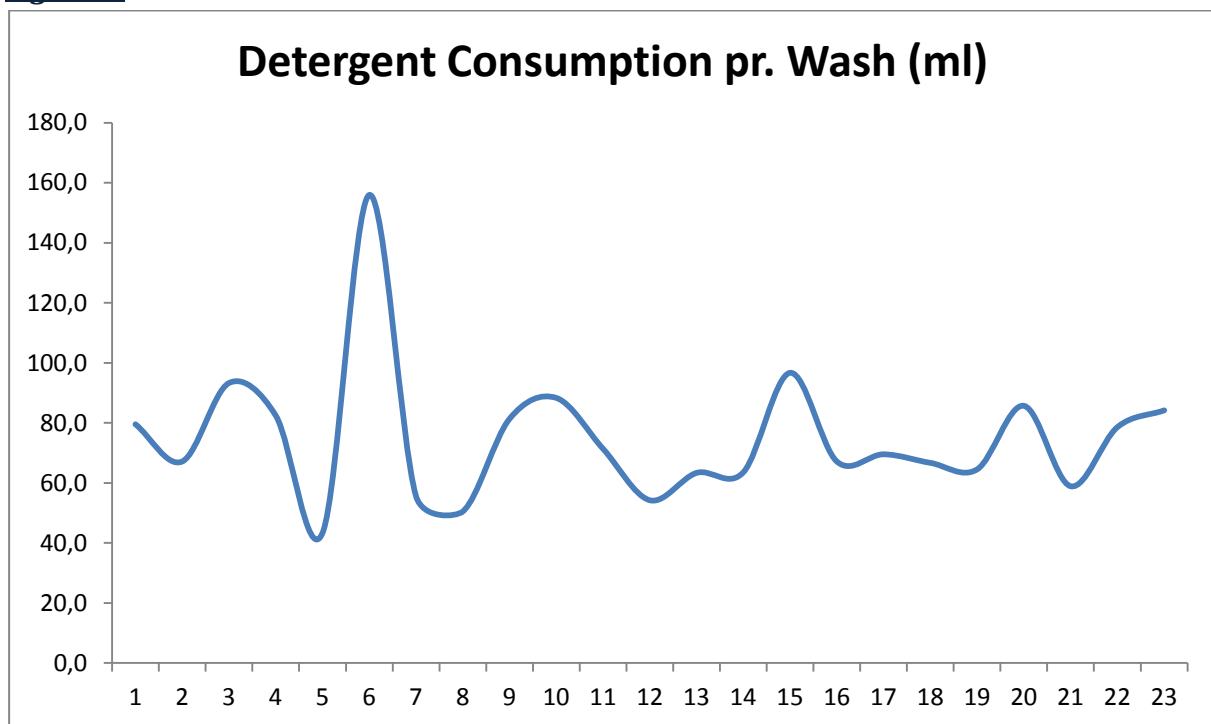
As the graph shows, there is a sleight downwards trend in the detergent level. Week 24 has been taken out, as I had only washing data up until the 30th of April, which was in the middle of a week, leaving a misleading level for week 24.

There are a number of fluctuations over the course of the 23 weeks. Some are explainable whilst others are not. The peek in week 6 is not explainable with any of the

data, which I registered in my logbook. This was the Christmas holiday, and only 97,7 washing programs were run that week, which is approximately half the amount that is of a normal week.

There is a sleight peek in week 9 and 10. This was due to an unexpected occurrence on the 24th of January 2015. Here the softening system broke down, and this meant that the machines were running on hard water instead of soft water. In this case staff and I agreed to advise users to add extra detergent to the wash load; 25ml for a full load and 17ml for a half-load.

In terms of accuracy in the measurements, there are certain risks attached in these measurements, as they relied on making correct measurements each week, and that the staff informed me of every detergent top up that took place. The measurements were made with a folding ruler, including ensuring an even level, and measuring four different places on the cylinder, in order to make as an as exact measurement as possible. Periods of different levels of detergent use, may also have affected the measurements as detergent at the bottom of the container was more compact, carrying the weight of the rest of the detergent. With the proper measurement equipment these risks could have been eliminated, if I had had e.g. a industrial weighing scales that could weigh the cylinder each week in order to measure the weight of the detergent, eliminating the consequence of the bottom detergent being more compact. This could have shown that detergent use is a lot higher than my measurements.

Furthermore, it is optional to use the detergent made available by the dorm, and some choose to use their own. This was also revealed through the survey. Out of the 40 participants that answered both surveys, 34 (85%) stated that they always use the detergent made available by the dorm, whilst 3 (7,5%) answered sometimes. By survey 2 this had changed to 32 (80%) who stated that they always uses the detergent made available by the dorm, whilst 5 (12,5%) answered sometimes This is a slight decrease and could indicate that some residents had noticed the fact that the detergent is Neutral white, which contains bleaching agents.

At the same time this means, that there are uncertainties about the detergent levels as I do not know to which extent other detergents were being used. Although staff did inform me, that they had noticed, a decrease in the need to refill detergent.

Had the baseline gone on for a longer period, there is a likelihood that the outcome would have been different, as some apartments wash clothes in bulk. These may well be due to the fact that some residents do not wash on a weekly basis, but instead wash several washes, every second or third week. If a large number of residents, that dose by eye, wash the same week, it can result in large quantities of detergent being used. This could explain why there have been fluctuations in the detergent levels used over the course of the experiment.

6.1.7 Resident' Evaluation of the Room

In survey two, I had the chance to evaluate the initiatives, information and the general changes I had made to the room. This was represented by ten questions in order to find out, how survey participants perceived the room and also evaluate the different initiatives. 39 (97,5%) respondents had stated that they had noticed the changes in the room.

In whether they had read the new dosage instructions, by the cylinder, 31 (77,5%) had stated that it was easy to follow, 2(5%) had that they found it hard to follow, while 7 (17,5%) had stated that they did not understand it.

Whether, they had noticed the dosage instructions in the soap bay in the washing machine, 27 (67,5%) stated that it was easy to follow. 5 (12,5%) had stated that it was easier to follow then the one by the detergent cylinder and 8 (20%) had stated, that they dose as they have always done.

The answers to these two questions could indicate that there is a group that have not been affected by the changes were made in the room.

When it comes to the quality and cleanliness of the clothes using the new dosage instructions 36 (90%) stated that the clothes get just as clean as before. 2 (5%) stated that it was better and without soap residues and 2 (5%) stated that the result was just as good as before. This at least indicates that users are not experiencing any loss of cleanliness by dosing correctly.

When it came to the stain removal station and using either the white vinegar or the stain remover 4 (10%) stated that they use both agents. 2 (5%) used the stain remover, 1 (2,5%) used the vinegar whilst 10 (25%) used their own. 6 (15%) stated that they did not know how to use it, whilst 17 (42,5%) stated that it was irrelevant.

When it came to whether respondents had read the washing advice, 6 (15%) stated that the washing advice was an eye opener, 21 (52,5%) stated that it was useful. 7 (17,5%) stated that there was nothing new and 6 (15%) stated that they had not read the washing advice.

When it comes to the articles on the notice board, 5 (12,5%) stated that it was a useful eye-opener, 17 (42,5%) stated that it as useful, 3 (7,5%) stated that there was nothing new while 15 (37,5%) had stated that they had not read the articles.

When it came to using the folding chairs and magazines 13 (32,5%) had stated, that it was nicer to wait for ones wash, 2 (5%) had said, yes it is ok and 25 (62,5%) had said no.

When asked how they perceive the room now. 31 (77,5%) stated, that it is more comfortable the before, 7 (17,5%) stated that it is cleaner then before and 2 (5%) stated that they could not fell a difference.

When it came to how they perceived the information/signs/initiatives, 15 perceived it as a kind/friendly hint, 23 perceived it as good guidance and 2 perceived it as pushy.

As such, there were mixed opinions towards the changes made and the information that had been provided. While the dosage instructions and to some extent the articles and laundry advice were well received, the chairs and stain-removal station were less relevant.

Drying Room

In survey 2, I also had the chance to find out whether, participants were interested in having a drying room as an alternative to using the tumble drier.

The majority of survey participants stated that they either always or sometimes use the tumble drier. 12,5% (in survey 1) and 7,5% (in survey 2) stated that they never used them. When asked whether, they would use a locked drying room, 14 (35%) stated that they would always use such facilities, while 16 (40%) answered sometimes.

Furthermore, there had been many comments from residents (survey participants and non survey participants) and staff, that there was a genuine interest for an alternative to the tumble driers. This lead to options being explored and a motion was put forward and gained majority at a residents meeting.

Disposal of clothing

When it came to the question of disposing clothes, people found it hard to give only one answer, therefore it was not possible to make any statistics over this question, as some only gave one answer and others chose to mark several of the boxes. But as such people do a variety of things, some throw clothes out, while others mend them and some give it to charity, whilst others save them for home use and paint jobs.

6.2   Discussion

The surveys revealed that people do laundry as a process of getting clothes clean and that many do limited care, when it comes to ironing and dry cleaning.

Seen as a whole there is no single way of thinking about laundry, but rather each person has their own sense making process about, when and how clothes should be washed. People practice laundry in ways that are convenient in our everyday lives, a task that most time efficient way. Therefore, there are certain routines attached to it e.g. some users book all four machines once a month and do laundry all at once or make certain compromises as to how much sorting they do. Interview participants, especially Sally

and Molly, were very conscious about how and when they wash, William and Patrick were looser in the way they talked about it, but were still aware that some items, needed special care, such as shirts and favourite t-shirts.

The survey also showed that people, experienced that the clothes became just as clean, following the new dosage instructions, but there is still problems in judging, when the machine is full, as I observed a guy, filling the machine ½-full, looking at the instructions in the soap dispenser room, and dosing for a full wash. As such there are still barriers that need to be overcome, when it comes to dosing correctly. Patrick has gone back to dosing by eye because it is not always, that that he fills the machine, but he still keeps within the interval of 50—70 ml. The fact that, only a few people stopped using the washing detergent after the information had been displayed that it contains bleachers, indicates that either people do not care or simply do not understand that bleachers fade clothes. William was quite surprised that this is the reason, why he experiences that his clothes get faded when washing. As such this can have implications as faded clothes, may be worn less and disposed of before time.

There is a lack of knowledge about, chemicals, textiles, and also smell e.g. how to get this out of clothes. Although there seems to be a general knowledge that fabric softener is unnecessary and bad for the environment.

Through the quasi-experiment, I found that over the course of the five months, minimal changes were made to the choices of programmes and the level of detergent being used. As such, it was harder than I thought to get the users to change behaviour and wash at 30°C. Personally, I have always been doing my laundry at the typical 40/60°C levels, but because I had tried washing at 30°C I realized, that washing at this temperature actually gets clothes clean.

In the following, I will discuss the three main insights that were made during this research.

6.2.1 Insight 1

There is gap between attitudes and behaviour, when it comes to doing laundry in a more sustainable way.

The majority of the participants agreed that the actions and the products we buy and our consumption of these, can have an impact on climate change, yet this did not translate into sustainable washing behaviour. The most popular programmes were 40°C and 60°C, even after users had been informed about sustainable laundry behaviour, and information about the detergent being suitable for washing at 30°.

Furthermore there were examples of residents that washed at high frequencies and too high temperatures, such as Sally, who washed 79 programmes over the course of 24

weeks and washes at 95°. This could indicate that there is a gap between being concerned with the environment, and acting in a more sustainable way.

While there is an interest and a willingness to wash sustainably the process is complex and people struggle to wash sustainably and live up to this. In a busy life, with studies and work people make use of strategies for doing laundry, make compromises, in order to cope with complex situations.

As a resident wrote in the comments part, at the end of the survey 2;

> *"It is an art to be a politically correct consumer (which is the real power you have as a citizen today). When you have to take both sustainability, working conditions (collective agreements). Multinational companies and their tax payments – and be able to afford new clothes + have access to it"*

> *(Freely translated)*

This statement illustrates the challenges consumers face today. While this survey participant is well aware that there are dilemmas, when it comes to the level in which the companies practice CSR and that she as a consumer has power through where she places her money, she is also driven by the desire for new clothes. She expresses a human dilemma and characterizes making the right decisions as an art. You can almost hear her giving up, while reading.

On the one hand what people need to realize is that it is not an either or, a yes or no to more sustainable practices. It is about realizing, that small changes in everyday life can make contributions as a whole and that laundry is a good place to start.

But this does not necessarily happen my giving more information to consumers. People are bombarded with stimuli all the time and unless they are passionate about sustainability they may not even stop and read a simple message. Even though William had stated, in survey 2, that he had read the article, the interview revealed that he had not.

> *"No I haven't read them… I don't, spend a lot of time in the laundry room, I may have on one occasion flicked through some of the magazines, but not the articles"*

> *(Freely translated)*

As such, it is about making it easy and compelling for people to engage with sustainable, so they do not consider sustainability as being an art. Sebastian was quite clear, is that if you want to move behavior, you need to address the automatic system.

Sally who washes a lot of washes, whilst stating in the survey, that she is concerned about the environment.

> *"I just want my clothes to be clean, my clothes are very different and I have to do a lot"*

(Freely translated)

William also mentioned time as a challenge when washing at 30°C, as this program has a short spin. While this was only a problem, if they were short of time one resident stated on survey 2;

> *"The dosage instructions etc. could easily be shorter. So a small sign could say "your clothes get just as clean at 30°C" and then people could read the longer explanation if they were interested in it. I don't wash at 30°C, because you cannot chose a program with a long spin at 30°C, you should talk to Miele about reprogramming the machines."*

(Freely translated)

This clearly states, that it is too much for her to overcome to run the extra spin program, so instead, she chooses not to wash at 30°C, e.g. it is not as easy as running a 40°C.

While lack of knowledge about sustainable laundry practices can feature as a barrier to sustainable laundry practices, it is not the sole reason that people do not wash sustainably. Bridging the gap between behaviour and attitude is about understanding and addressing these barriers, in order to make it easier for consumers to make choices that match their attitudes. This could be though asking them to actively engage in a sustainable washing practice, the so called foot-in the door.

6.2.2 Insight 2

Past experiences affect how we receive information and create biases in process of doing laundry.

While we practice laundry in ways that are convenient in our everyday lives, our laundry practices are also shaped by our factors such as upbringing and past experiences. The experiences help create biases in terms of the perception of cause and effect e.g. Sally's reason for washing dishcloths at 95°C is determined by the lessons learned from home and her reasoning seems to be that because bacteria are bad, they need to be washed at the highest temperature, while she continues to wash underwear at 60°C.

Furthermore Sally washes on average 3,3 washing programs a week, partly to avoid discoloration and shrinking of clothes. Yet, if Sally washed her clothes together at low temperatures, and only washed new clothes separately, she would avoid both of these mistakes.

Molly, has also brought lessons from her upbringing and past experiences;

> *"my mum has always told me that it has to be at 30°..., 30°C or 40°C and then I have just..., it's just one of those things, I suppose, so if it can be washed at low temperatures, both because of the environment, but also because it damages the clothes"*

(Freely translated)

Molly has attended classes about hygiene through her education and is well aware that in order to kill bacteria you need to wash at 60°C, but she still washes underwear at 30°C. When asked about this she laughed a little and answered;

"I haven't gotten ill, but the though did strike me when I took the class"

(Freely translated)

So even with this knowledge, she has not changed her behaviour, partly out of experience, but also because she has not had any bad experiences in connections with her laundry behaviour.

In order to influence these biases bad behaviour needs to be addressed in a way that people can resonate with. A lot of people have experienced soap residues on black clothes. Informing users about the fact that overdosing leaves soap residues helped nudge people in the right direction. But if people have not experienced bad results, there may be hesitations to change behaviour. As such, Molly's behaviour is not necessarily bad, as she washes her clothes at 30°C. But in essence the machines, that she uses, will be left with a layer of bacteria for the next user, hence posing possible risk to more than her.

6.2.3 Insight 3

Laundry has low priority with the main goal of having clean clothes.

Encouraging individuals to engage in a new activity, such as lowering the temperature from 40°C to 30°C turned out to a lot more complex than first assumed. Many link temperatures with cleanliness and while this is true when it comes to removing bacteria, one can easily wash clothes at 30°C.

The semi-interviews revealed that there is no single way of thinking laundry, but rather each person has their own sense making process about, when and how clothes should be washed. Smell and to some extent feeling, seemed to be repeating features, when it comes to determining when clothes should be laundered.

The majority of survey participants answered that they wash clothes because they are dirty and smell. Put simply, people want clean clothes, and when they are used to getting good results at a temperature, they stick to this, without reflecting on whether this is the right temperature.

Furthermore there seems to be a lack of knowledge and misunderstanding about temperatures. William's reflection about whether his bed linen just as well can be washed at 40°C as 60°C, indicates, that he is not aware that house-dust mites get killed at 60°C or else he might not care. Sally washes at 95°C to get rid of bacteria, even though bacteria are killed at 60°C.

As Hanna from SPT stated:

> *"The biggest hurdle is that instinctively it feels wrong to wash at lower temperature. Because it has always been the way that, if it has to be really clean, then you need to wash at high temperatures. Consumers need to learn that there is new technology in the form of enzymes that makes it possible to get clean clothes at low temperatures. And that washing machines have changed and wash effectively at low temperatures."*

> *(Freely translated)*

As people are risk-adverse, they may feel that they might miss out on clean clothes; this fear of loss is stronger, even if the person's attitudes and values indicate that they want to be sustainable. If users are used to getting a good result at 40°C, they will keep doing laundry at 40°C.

When it comes to washing favorite clothes, and certain clothes types, there seems to be some considerations as to treating them with extra care, e.g. William does not put his favorite t-shirts in the tumble-drier and Patrick washes shirts at 30°C. Sally stated that she washes fragile items at 30°C. This could indicate that there is a common awareness that clothes easily wear out if treated at higher temperatures yet, this does not translate into lowering the temperatures from 40°C to 30°C in general.

Furthermore, some consumers rely heavily on the care label, so when the care label says 40°C, then you have to wash at 40°C and some use this as a default setting even though, this temperature represents the maximum temperature in which the clothes can be washed at and not which temperature that the clothes get clean.

When you give washing advice through temperatures, what is essentially is being asked of consumers, is to use their reflective system, and to stand and judge, what type of clothing is it, and how dirty is it in order to determine what temperature it should be done at. As people do not prioritize laundry, they are likely to give in to their cognitive biases and go with the default setting, which is often according to the care label, 40°C.

When researching for a reasonable explanation, for why washing machines are still designed with a 40°C programme, I did not manage to find a valid reason. Whether it dates back to when detergents were less effective or whether there are other reasons, I simply do not know. But as such it had been a challenge, through my research, that users treated this programme as if it default setting.

Both the interviews and handwritten comments in the survey, revealed that quite a few of the resident did not know about the E40 (half-40°C) program even though this information had been available before my intervention. Therefore this could indicate that these residents do not seek out information about the different options but goes along with the status quo of washing full loads. But it could also be that there are too many options for people to keep track of 9 programs, a rinse and a spin program.

Less is not always more, and more options do not always make people happier, on the contrary you run the risk of confusing users and, when they are confused, they often fall back on habits because, it takes too much effort and conscious thinking to choose from a lot of options. As people like having a default setting, it might be useful to work towards making 30°C and eliminating the 40°C all together.

6.3   Conclusions

In order to answer my research-question, various aspects of laundry and clothes care practices were explored in this thesis. Barriers that prevent people from behaving in more sustainable ways as well as ways to overcome these were explored.

My main research question was to find out, how to encourage sustainable behaviour in the customer care phase of clothes' PLC. This was done through a quasi-experiment, carried out at an urban student dorm Kollegiet Sofiegården. This experiment was paired a 2 step survey and semi-structured interviews in order to create more validity to my findings, as well as getting deeper insights into the barriers that prevent people from acting in a more sustainable way.

The literature review gave insights into the history of laundry practices, and social norms concerning these. The main conclusions are that the frequencies in which we do laundry have increased in line with the introduction of the washing machines into people's homes. Furthermore, business models such as Fast Fashion, has influenced how we consume and care for our clothes, as well as the frequency, in which we dispose of these. The literature review also included insights into Behavioural Theory. Human behaviour is guided by two systems; the automatic and the reflective system. Because there are limits to our cognitive resources, humans sometimes rely on biases and heuristics. These can lead to bad decisions and behaviour, which can have negative consequences for either our selves or society. By designing behaviour, that addresses the automatic system it is possible to change behaviour. Also, the literature review took a look at tools and models for changing behaviour. This included the CBSM strategy which offers suggestions and methods for fostering sustainable behaviour at a community level.

The quasi-experiment was conducted through 6 stages over the course of 24 weeks including a baseline period. During this period, I made use of active research, participant observation and a 2 step-survey, which was handed out to residents in their post-boxes. These surveys gave an insight into laundry behaviour, and clothes care, as well as values and attitudes towards sustainability. Furthermore, I actively participated in resident meetings in order to push my sustainable agenda, change prices and fees as well at gathering support to create a drying room.

Following the baseline period, different methods and tools were tested, in order to encourage sustainable behaviour. Detergent levels and washing program data was collected through the whole experiment as to measure to which extent, behaviour had changes. There were two areas, where I wanted to change behaviour; dosing detergent and getting residents to lower the temperature to 30°C.

Nudges, along with better dosage information, were used to change the behaviour of overdosing detergent. Results, showed, that modest changes in the detergent levels had occurred. If the baseline period had been longer or the project in is whole had gone on for longer, a clearer picture of trends might have appeared. These results are attached with risks, as measurement equipment was insufficient, but also risks, that staffs were not informing me correctly about refilling detergent.

Information and a stain remover station were used to encourage residents to lower the temperature to 30°C. The results show that there has been a slight increase in the number of 30°C washes over the course of 24 weeks. Reasons why these increases are not higher, can be due to the fact that residents see it as a barrier that the 30°C programs have a short spinning cycle, and hence may need to run an extra spin program.

A general heightening of standards, chairs and a magazine shelf were used to create an atmosphere that was welcoming along with a sign reminding people to clean up after themselves.

Two ancillary-interventions were introduced, one in the shape of financial incentives following the CBSM strategy. The second ancillary-interventions was in the shape of signs informing users about the energy savings that come from lowering the temperature along with a sign saying "30°C is the new 40°C" The financial incentives, seemed to have increased the number of the E40 programs (half-40°C) and also the 30°C washes.

As some of my interventions were implemented simultaneously, it is hard to say with accuracy, which incentives had the biggest effect. Therefore, it can be debated whether this lives up to the criteria of testing nudges and information.

Through the process of the quasi-experiment and interviews with experts and residents, three valuable insights, were found, and discussed. These main findings were;

- There is a gap between attitudes and behaviour, when it comes to doing laundry in a more sustainable way
- Past experiences affect how we receive information and create biases in process of doing laundry
- Laundry has low priority with the main goal of having clean clothes

These insights represent challenges towards encouraging sustainable behaviour in the consumption phase of clothes' PLC. Opportunities for meeting the challenges can be found in Behavioural Theory and CBSM and include designing washing machines with limited options and the default setting at 30°C. Challenging human biases around laundry practices, through the "foot-in the door method" by actively asking consumers to try to lower the temperature and evaluate the result. Furthermore, one can work actively at promoting sustainable washing behaviour at community, e.g. working with housing communities that have common laundry facilities.

My findings also show that laundry and clothes care as a whole are under prioritized, people do not want to spend hours doing laundry, ironing ,repairing and as such, clothes care is dying. This can be a consequence of the Fast Fashion business model, as this creates an abundance of clothes that floods the market. This model has led to low price, which leads to low quality, creating a spiral of clothes being turned into waste at a high pace. This is an unsustainable pathway that needs to be addressed.

Humans have good intentions. So if they do want to become more sustainable, they just need to be helped in decisions that are complex and are of low priority to them in their hectic everyday lives. This can be done by making it easy and more intuitive to do the right thing.

While there are people making these changes by own initiative, sourcing out the information and making conscious decisions, there is still a need for the general public to make more sustainable choices. It is not necessarily because they do not want to, simply because they either do not know how or because, there are too many barriers that prevent them from acting more sustainably.

7. MANAGERIAL IMPLICATIONS

While the contributions in this thesis are modest, there are still aspects that can be of interest, from a managerial perspective.

If sustainable laundry behaviour is to have a serious impact, one should not solely rely on making informational campaigns as both mine and other research shows, that it has limited effect on actual behaviour. In order to create a change that is visible, action needs to be taken by a number of actors mainly in the clothing, detergent and washing machine industry. Trade organizations can be a valuable source of bringing these different actors together and make real change.

Furthermore, I found that people are not unwilling to make changes. But it needs to be easy for people and address the automatic system. Most detergents use enzymes and most washing machines can wash at 30°C. One can therefore question, why washing machine producers still offers large numbers of different programs, which only contribute to confusing users about temperatures, a task that is already done with little empathy. Sebastian made an important point that Apple users always underline the user-friendliness and intuitiveness of these products. This is because Apple has put user friendliness at the heart of their business model. Therefore by focusing on user-friendliness, instead of offering a large number of programs, can help guide consumers in a more sustainable directions. Especially manufacturers of washing machines need to understand that people do not use washing machines - they use the function of getting clean clothes.

But while waiting for the industries to acknowledge this, working at a community-based level also offers managerial implications. Although at the overall level the changes were minor in the quasi-experiments, the interviews gave me an impression that some of the participants had at least reflected over temperatures and their general washing habits.

As such, the next step could be a CBSM-strategy, where dialog and more face-to-face communication is incorporated into the strategy. This could be done by going into deeper discussions, informing residents of why clothes get clean at low temperatures and answering questions of concerns giving insights into why you can get clothes clean at 30°C. But also challenge old habits of washing at high temperatures. This could be done by working actively with housing communities with common laundry facilities. Here a strategy could involve creating common goals for reducing water and energy levels in the laundry facilities, and making use of prompts in these in this area in order to remind people to act. Also asking more people to change one of their 40°C washes to a 30°C could be a way forward, as experiencing and evaluating the end result, may help consumers to realise that they don't lose cleanliness by turning down the temperature.

While the CBSM strategy offers many different options, the most important factor is to make it easy for people to engage in the preferred behaviour.

Furthermore the fashion industry is dependent on technology developments in order to reverse the negative impact of waste that the industry and particularly the Fast Fashion business model have created. Easy and cheep access to clothing is creating an abundance of waste. Furthermore it has consequences for how people treat their clothes in the care phase of clothes PLC. Therefore advances in technology, making it possible to recycle clothes fibres needs to be spread out and promoted on a larger scale.

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9. APPENDICES

Appendix 1 – Pre-Intervention

Appendix 2 – Post-Intervention

Appendix 3 – Chairs and Magazine Holder and Artwork

Appendix 4 – Dosage Instructions
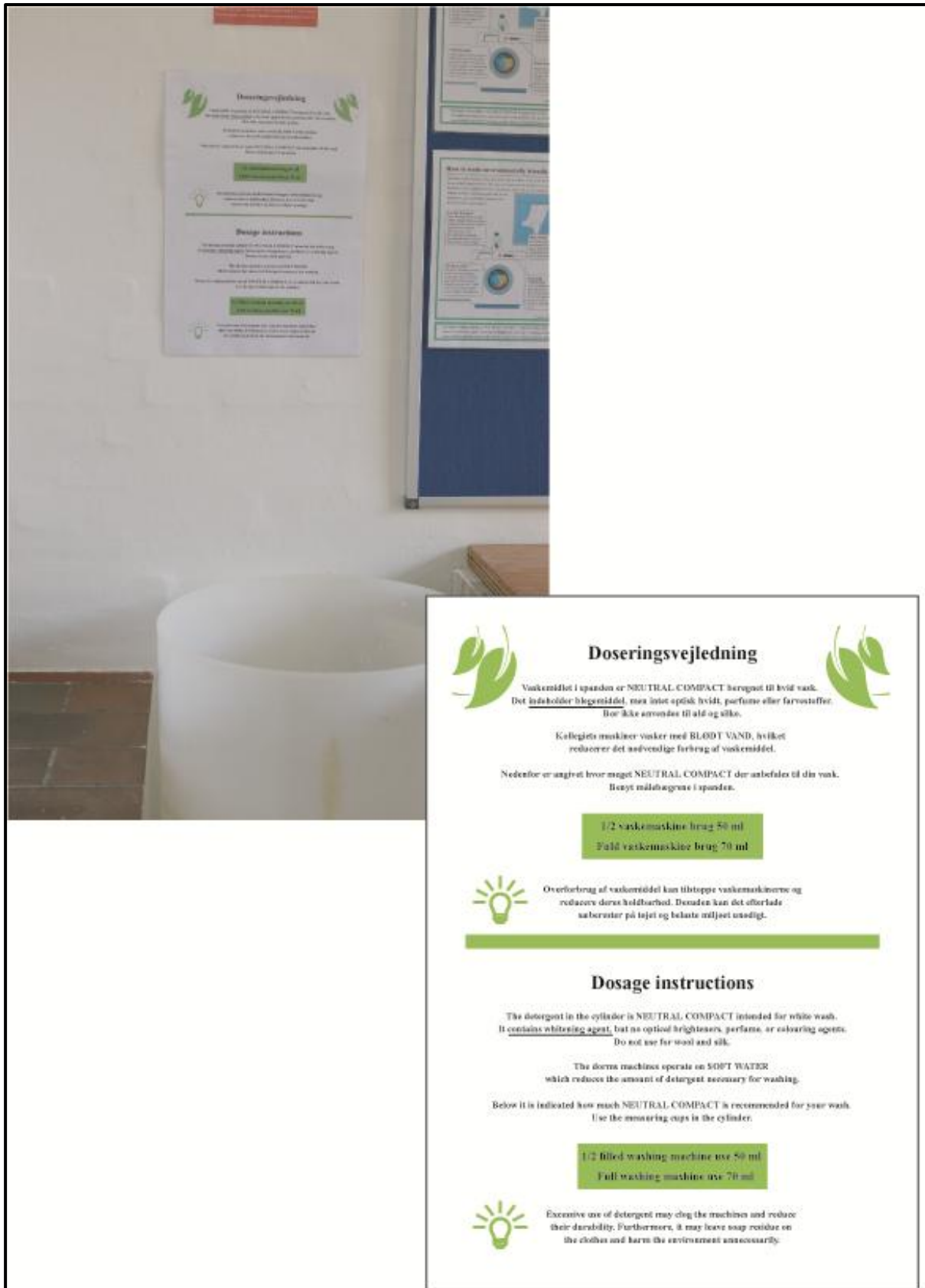
Appendix 5 – Dosage Instructions in the Form of a Nudge

Appendix 6 – Laundry Advice Politiken

How to wash environmentally friendly

Cut down on the chemicals. Buy detergents with eco labels - it could be the Nordic Swan or the European Flower. This way you ensure that the detergent is among the least environmentally harmful on the market. Also, look out for detergents without perfume, colouring agents and optical brighteners, and avoid fabric softeners, as it does not make clothes cleaner.

Use less detergent
More detergent does not make clothes cleaner. Dose according to the care label on the product, and the water hardness. This way you avoid harming the environment unnecessarily and you avoid soap residue on the clothes.

Skip a wash
Air clothes now and then instead of washing them. And use the clothesline instead of the tumbledryer.

Fill the machine
Fill up the machine and save both water and electricity. Preferably, skip the prewash and select a short program. Instead, you can wash visible stains of the clothes before you put them in the machine.

Lower the temperature
A lot of clothes can get clean at 20°C or less. When you wash at lower temperatures, you need to use a detergent intended for it.
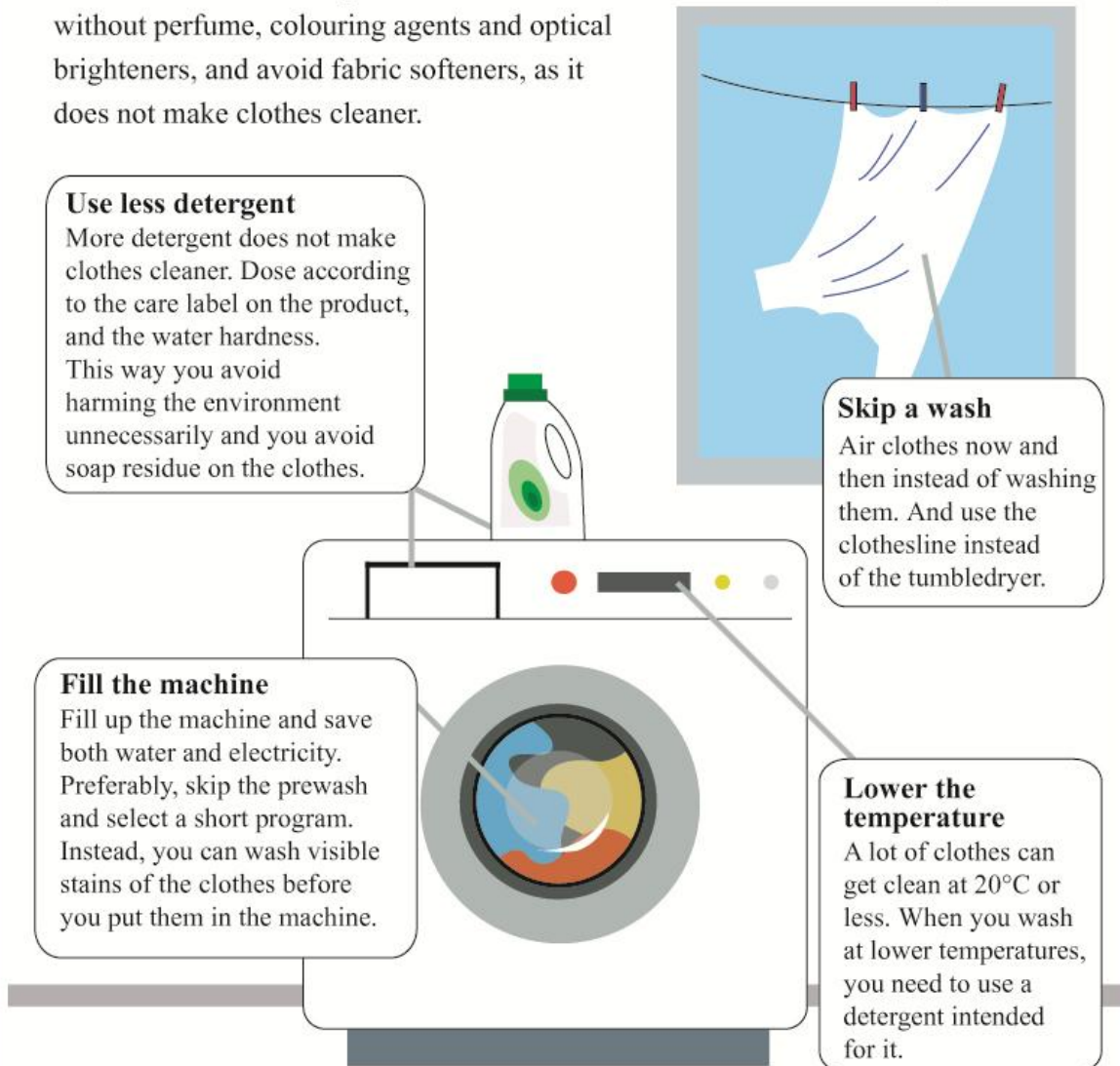
Source: Politiken

The dorms washing detergent is NEUTRAL COMPACT intended for white wash. It contains whitening agent, but no optical brighteners, perfume, or colouring agents, and is labelled with the Swan and the Danish Asthma and Allergy Association emblem.

Appendix 7 – Keep it clean

Appendix 8 – Poster

Appendix 9 – Stain Removal Station

Appendix 10 – New Laundry Prices

VASKEPRISER
[Laundry Price List]
pr. 2. marts 2015

A 95	Lav vandstand, 3 skyl, lang centrifug. 1200 omd./min.	15 kr.
A 60	Lav vandstand, 3 skyl, lang centrifug. 1200 omd./min.	12 kr.
A 40	Lav vandstand, 3 skyl, lang centrifug. 1200 omd./min.	8 kr.
B 95	Lav vandstand, 3 skyl, kort centrifug. 900 omd/min	15 kr.
B 60	Lav vandstand, 3 skyl, kort centrifug. 900 omd./min.	12 kr.
B 40	Lav vandstand, 3 skyl, kort centrifug. 900 omd./min.	8 kr.
C 60	Hoj vandstand, 3 skyl, kort centrifug. 600 omd./min.	12 kr.
C 30	Hoj vandstand, 3 skyl, kort centrifug. 600 omd./min.	8 kr.
D 30	Middel vandstand, 2 skyl, kort centrifug. 900 omd./min.	7 kr.
E 40 (½ fyldning)	Lav vandstand, 3 skyl, lang centrifug. 1200 omd./min.	5,50 kr.
F - skyl	1 skyl, kort centrifug. 900 omd./min.	1,50 kr.
G - centrifugering	Lang centrifug. 1200 omd./min.	0,50 kr.
Forvask	Lav vandstand, kort centrifug. 900 omd./min.	5 kr.
Tørretumbler		0,50 kr./min.
Udeblivelse	Mere end 10 min. forsinket fremmode	10 kr.

Appendix 11– Temperature Nudges

Appendix 12– Survey Results

SURVEY CONCERNING LAUNDRY HABITS, CLOTHES CARE AND SUSTAINABILITY

STEP 1 RESULTS

Questions 1, 2 and 4

Background varibles	Survey 1		Survey 2	
Number of respondents (n)	56		40	
Gender				
Male	21	37,5%	14	35,0%
Female	35	62,5%	26	65,0%
Avarage age	26,4		26,5	
Below 25 years	14	25,0%	11	27,5%
25-29 years	36	64,3%	23	57,5%
30-34 years	4	7,1%	4	10,0%
35-39 years	1	1,8%	1	2,5%
40-44 years	1	1,8%	1	2,5%
Children				
Yes	4	7,1%	3	7,5%
No	52	92,9%	37	92,5%

■1 per.　■2 per.　■3 per.　■4 pers.

3. How many residents are you in the household?　21　16　2　1

■ Yes, it is solely me who washes the laundry
■ Yes, it is equally shared between the residents of the household
■ No

5. Do you partake in the household laundry wash?　27　13

■ I wash clothes because it is dirty or smells ■ I wash clothes to feel clean and groomed

■ I wash clothes out of routine and by habit

6. What statement describes the best, why you…	28	9	3

■ Less than 1 time a week ■ 1-2 times a week ■ More than 2 times a week

7. How often do you wash laundry in your…	30	9	1

Q8. How often do you wear a clothes item before it is washed?					
	Underwear	T-shirts/shirt	Blouses/jumpers	Pants/jeans	Dresses/skirts
Average wear	1,1	2,6	4,4	6,5	4,8

■ I do not sort my clothes

■ I sort my clothes according to colour, dark and white

■ I sort my clothes according to washing temperature

■ I sort my clothes according to the care label

9. How do you, most often, sort your clothes before washing?	2	22	15	1

■ Always ■ Sometimes ■ Never

10. How often do you fully load the washing…	25	15	
11. How often do you use the washing detergent…	34	3	3
12. How often do you wash with prewash?	3	4	33
13. How often do you wash at 30 degrees?	4	25	11
14. How often do you wash on half program?		13	27
15. How often do you wash clothes by hand?		20	20
16. How often do you use fabric softener?	1		39

■ Brands

■ Something on offer

■ The cheapest

■ Eco-labelled detergent (i.e. the swan, the EU-flower etc.)

17. When you are in the supermarket, what kind of washing detergent would you choose to buy?
0 | 4 | 3 | 28 | 5

■ I use the same detergent for all my clothes

■ I use one type for white wash and another for coloured wash

■ I use different types depending exactly on what I have to wash

18. How do you use washing detergent?
27 | 6 | 7

■ I carefully measure so it fits the amount of clothes I have to wash

■ I dose by the eye

■ I add some extra to be sure that the clothes will get clean

■ The washing machine doses automatically

19. What statement fits the best, when you dose…
14 | 25 | 1

■ Always   ■ Sometimes   ■ Never

20. How often do you use the tumble drier?
11 | 24 | 5

■ It is irrelevant, as I iron all my clothes   ■ I only iron my work clothes

■ I only iron clothes for special occasions   ■ I never iron my clothes

21. On which occasions do you iron your clothes?
4 | 28 | 8

Yes ■ **No** ■ **It is irrelevant, as I don't take showers**

22. When you go for a shower, do you use the steam from the shower to smooth out your clothes?
| 3 | 37 |

■ Always
■ I only send my work clothes to dry cleaning
■ I only send clothes to dry cleaning for special occasions
■ Never

23. When do you send your clothes to dry cleaning?
| 2 | 19 | 19 |

■ Always ■ Sometimes ■ never

24. When do you air your clothes as opposed to washing it?
| 1 | 25 | 14 |

Questions 25 and 26 have not been included as people gave multiple answers to these questions.

Q25. What do you do, most often, with damaged clothes?

Q26. What do you do, most often, with clothing that is still usable, but which you do not wish to wear any longer?

Values and Attitudes

Legend: ■ Completely agree ■ Agree ■ Neither agree or disagree ■ Disagree ■ Strongly disagree

Statement	Completely agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
27. I do an active effort to live sustainably	6	20	12	2	
28. I worry about the environment and climate change	14	23	3		
29. I believe that people first and foremost are causing climate change	18	16	6		
30. I believe that I can make a difference in relation to the environment through the choices I make…	15	16	5	4	
31. I willingly pay extra for sustainable products	10	16	9	5	
32. I consider the environment before I throw a piece of clothing for wash	3	13	8	13	3
33. I am conscious about washing clothes in the most sustainable way	5	12	17	5	1
34. I do not feel that I am sufficiently informed to be able to wash sustainably	1	13	11	14	1
35. I expect to wash more sustainably in a year	2	7	25	6	
36. I always buy brand new clothes	3	9	5	18	5
37. When I buy clothes, I always choose the most sustainable	2	1	14	18	5
38. It is difficult to buy sustainable clothes	4	16	19	1	
39. I do not feel that I am sufficiently informed to be able to buy sustainable clothes	8	15	8	9	
40. When I get dressed I always choose the most sustainable clothes		2	8	20	10
41. I am conscious of taking care of my clothes, so that it will last longer	9	19	8	4	
42. I expect to buy more sustainable clothes in a year	2	2	28	7	1

SURVEY CONCERNING LAUNDRY HABITS, CLOTHES CARE AND SUSTAINABILITY

Step 2 Results

Q1. How often do you wear a clothes item before it is washed?				
	Underwear	T-shirts/shirt	Blouses/jumpers	Pants/jeans	Dresses/skirts
Average wear	1,2	2,4	4,2	5,7	4,1

Legend: Always (blue), Sometimes (red), Never (green)

Question	Always	Sometimes	Never
2. How often do you fully load the washing machine?	27	12	1
3. How often do you use the washing detergent made available by the dorm?	32	5	3
4. How often do you wash with prewash?	3	6	31
5. How often do you wash at 30 degrees (C30 or D30)?	4	28	8
6. How often do you wash on half program (E40)?		16	24
7. How often do you wash clothes by hand?		24	16
8. How often do you use fabric softener?		3	37

Legend:
- I use the same detergent for all my clothes (blue)
- I use one type for white wash and another for coloured wash (red)
- I use different types depending exactly on what I have to wash (green)

9. How do you use washing detergent?	31	3	6

Legend:
- I carefully measure so it fits the amount of clothes I have to wash (blue)
- I dose by the eye (red)
- I add some extra to be sure that the clothes will get clean (green)
- The washing machine doses automatically (purple)

10. What statement fits the best, when you dose…	18	22

Questions 15 has not been included as people gave multiple answers to these questions.

Q15. What do you do, most often, with damaged clothes?

18. Have you read the new dosage instructions by the detergent cylinder?

- ■ Yes, it is easy to follow
- ■ Yes, but I think that it is hard to follow
- ■ Yes, but I do not understand it
- ■ No, I dose as I have always done

Yes, it is easy to follow	Yes, but I think that it is hard to follow	Yes, but I do not understand it	No, I dose as I have always done
31	2	7	0

19. Have you noticed the dosage instructions in…

- ■ Yes, it is easy to follow
- ■ Yes, it is easier to follow than the one by the detergent cylinder
- ■ Yes, but I think that it is hard to follow
- ■ Yes, but I do not understand it

Yes, it is easy to follow	Yes, it is easier to follow than the one by the detergent cylinder	Yes, but I think that it is hard to follow
27	5	8

20. How do you perceive the wash quality and cleanliness with the new dos. instructions?

- ■ The result is better and without soap residue
- ■ The clothes get just as clean as before
- ■ The result is not as good as before

The result is better and without soap residue	The clothes get just as clean as before	The result is not as good as before
2	36	2

21. Do you use the stain removal station?

- ■ Yes, I use both agents
- ■ Yes, I only use the stain remover
- ■ Yes, I only use the vinegar
- ■ No, I use my own agents
- ■ No, I do not know how to use it
- ■ No, it is irrelevant

Yes, I use both agents	Yes, I only use the stain remover	Yes, I only use the vinegar	No, I use my own agents	No, I do not know how to use it	No, it is irrelevant
4	2	1	10	6	17

22. Have you read the washing advice?

- ■ Yes, it was really a useful eye opener ■ Yes, it was useful ■ Yes, but there was nothing new ■ No

Yes, it was really a useful eye opener	Yes, it was useful	Yes, but there was nothing new	No
6	21	7	6

23. Have you read the articles on the notice board?

- ■ Yes, it was really a useful eye opener ■ Yes, it was useful ■ Yes, but there was nothing new ■ No

Yes, it was really a useful eye opener	Yes, it was useful	Yes, but there was nothing new	No
5	17	3	15

■ Yes, it is nicer and more relaxing to wait for ones wash   ■ Yes, it is ok   ■ No

24. Have you used the folding chairs and magazines?

13	2	25

■ It is more comfortable and welcoming than before

■ It is cleaner than before

■ I cannot feel the difference

■ I liked the old one better

25. How do you perceive the laundry room now?

31	7	2

■ As a kind/friendly hint   ■ As good guidance

■ As pushy   ■ As violation of personal freedom

■ I liked it better as it was before   ■ I do not care

26. How do you perceive the…

15	23	2

Values and Attitudes

Legend: Completely agree | Agree | Neither agree or disagree | Disagree | Strongly disagree

Statement	Completely agree	Agree	Neither agree or disagree	Disagree	Strongly disagree
27. I do an active effort to live sustainably	5	24	10	1	
28. I worry about the environment and climate change	12	26	2		
29. I believe that people first and foremost are causing climate change	14	20	6		
30. I believe that I can make a difference in relation to the environment through the choices I make…	12	24	3	1	
31. I willingly pay extra for sustainable products	5	26	5	4	
32. I consider the environment before I throw a piece of clothing for wash	3	16	11	10	
33. I am conscious about washing clothes in the most sustainable way	2	21	14	3	
34. I do not feel that I am sufficiently informed to be able to wash sustainably		8	12	19	1
35. I expect to wash more sustainably in a year	1	15	17	7	
36. I always buy brand new clothes	2	10	5	17	6
37. When I buy clothes, I always choose the most sustainable		3	14	21	2
38. It is difficult to buy sustainable clothes	5	15	16	4	
39. I do not feel that I am sufficiently informed to be able to buy sustainable clothes	6	15	11	7	1
40. When I get dressed I always choose the most sustainable clothes		1	5	25	9
41. I am conscious of taking care of my clothes, so that it will last longer	11	18	6	5	
42. I expect to buy more sustainable clothes in a year	1	6	23	9	1