Examining barriers and opportunities to sustainable behaviour

Linking knowledge and participation amongst young persons in urban environments

## Jennifer Lenhart

Supervisors

Naoko Tojo

Thesis for the fulfilment of the
Master of Science in Environmental Sciences, Policy & Management
Lund, Sweden, June 2007

MESPOM Programme:

Lund University – University of Manchester - University of the Aegean – Central European University

iiiee

Erasmus Mundus Masters Course in
Environmental Sciences, Policy and Management
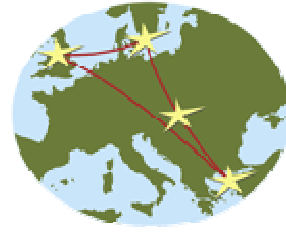
MESPOM

This thesis is submitted in fulfilment of the Master of Science degree awarded as a result of successful completion of the Erasmus Mundus Masters course in Environmental Sciences, Policy and Management (MESPOM) jointly operated by the University of the Aegean (Greece), Central European University (Hungary), Lund University (Sweden) and the University of Manchester (United Kingdom).

Acknowledgements

An author's thesis is the end product of many peoples' inspiration, patience, listening ears, creative expression and wise interpretation. First and foremost, I would like to thank my thesis advisor, *Naoko Tojo* for her patience, her expertise, her extra effort and her subtle genius, to put it best. She rescued me when I was confused and discouraged, taking the time to really see the value of each paragraph and every word. Her ability to see both the big picture and the little things will not be forgotten.

Secondly, I would like to thank amongst others, *Roland Zinkernagel, Daniel Nilsson, Johanna Ekne* and *Malin Norling* at Malmö's Environmental Department for their time, their guidance and for helping my thesis take on a practical application. As well as teachers *Magnus Ekenstierna, Jeanette Gruner-Viig, Conny Knutsson* and *Tommy Lindström* who provided a platform to test the research. I would also like to thank two inspiring and renowned architects, *Jan Gehl* and *Krister Wiberg*, as well as a Professor *Anna-Lisa Lindén,* an expert in energy behaviour. All have been supportive in my learning journey by bestowing inspiration from their experiences as well as enthusiasm and insight for the future.

Of course a thesis is only the final product of two years of challenges and learning and thus, I would like to thank *Aleh Cherp* for the opportunity to participate in the adventure that was MESPOM and *Håkan Rodhe* for all the patience and support while studying at IIIEE. In writing this, I am sad to know that it will soon end.

Accordingly, I would also like to thank all of my friends who supported my personal and academic growth along the way. *Tahia Devisscher* and *Janis Rungulis*, my wonderful roommates and family in Budapest, *Deepak Rai* and the *Indian cohort* who taught me a new sense of enlightenment, *Rachelle Bissett-Amess* who reminded me to relax and *Einar Alhström* who put up with me when my research became an obsession as I attempted to turn off every light or even the oven before food was fully-cooked, to save energy.

And of course all the amazing personalities, nationalities and *mad brilliance* that mixed together to shape and spice MESPOM Batch 1, 2005-2007. Your thoughts, passion, insight and maybe even insanity (myself included), will not be forgotten.

Finally, to my parents, *Margareta* and *Craig Lenhart*, for their love, support, encouragement, patience, and wisdom; but also, for *living* what they believe in and granting me the courage to do the same.

Abstract

No setting more clearly demonstrates human influences than metropolitan areas that live and breathe human diversity, novelty, intensity and choice, but also environmental and social burdens. Technological solutions offer one avenue of support to alleviating many urban environmental stresses. However, sincere sustainability in urban environments can only be achieved if citizens *choose to* utilize technological improvements and public infrastructure, and *participate* in patterns of sustainable behaviour. To justify infrastructural and policy investments, urban governments should balance resource management, technological implementation, whilst *simultaneously* promoting sustainable behaviour amongst urban citizens.

This research examines factors influencing citizen participation in environmental behaviour and also context-specific barriers of a case study target group. Specifically, the target group addressed is young persons in Lund and Malmö and their behaviour concerning energy consumption and related environmental impacts. Background research and literature from previous studies is then applied to the case studies in Lund and Malmö. Primary research findings assessed the role of *current* theoretical knowledge and practical application, as well as other factors influencing young persons' behaviour. An effectiveness evaluation was also undertaken to examine the value and usefulness of the strategy utilized to influence positive behavioural change amongst the target group.

Executive Summary

Cities represent the heart of our civilization, our past and our present. They are sources of enterprise, boast inspiring architecture, stimulate evolving cultural practices and symbolize the *locus of change* via expansion of ideas, such as good governance and public participation. Beyond the benefits of urban living however, cities also require vast areas of land and natural resources to maintain urban populations.

Humanity and our urban way of life then, are at a crossroads. As we move forward and expand urban living, we will have to create communities that consume far fewer resources and use such resources far more efficiently.

Numerous technical improvements offer suggestions to curb environmental harms associated to modern living. However, while technical solutions provide legitimate recommendations, such solutions can not be effective without people *choosing* to implement such technology and *utilizing* public infrastructure. Particularly in urban settings with concentrated populations, public participation in environmental behaviour and use of efficient technologies is needed to reduce environmental impacts and improve urban sustainability. Correspondingly, public participation is an evolving discourse in the realm of urban sustainability. It entails stimulating synergistic interactions between citizens and institutions, utilizing public ideas, providing an open forum for public discourse and *engaging citizens* in improved choice alternatives.

Public participation, as it is considered in this thesis examines the elements of building enhanced participation, particularly in the realm of sustainable behaviour. *What makes some citizens incorporate sustainable behaviour, whilst others do not?*

The aim of this research is to contribute to the understanding of factors influencing environmental behaviour. A specific objective was to analyze *current* environmental awareness amongst young persons in Malmö and Lund and if this influences their behaviour. This research also aims to identify barriers specific to the case study. It is expected that the results of the research will contribute to an on-going project of Malmö's Environmental Department to create an interactive tool catered towards youth to motivate reduced energy consumption.

To discover what influences participation, an assortment of disciplines were consulted, including environmental psychology, sociology, architecture and urban planning, as well as policies to incorporate public participation. From such disciplines, influencing factors were examined as elements affecting consequent behaviour. Primary factors considered in the literature review include the following: media and information visibility, experience, culture and norms, demographic foundations, emotions, responsibility, social capital, assess to infrastructure and a supportive community space, as well as safety and practicality. Various negating factors, or barriers, were also considered, such as: laziness, lacking alternatives and limitations in time, income, price, perception, etc.

Upon analysis of influencing factors, various strategies were examined, including the use of *incentives-based instruments, comparative feedback to instigate competition,* and *Community-Based Social Marketing* as a collective strategy to overcome barriers and stimulate behavioural change. Such methodologies were considered for their ability to *motivate* increased levels of participation in sustainable behaviours in daily choice-alternatives within an urban environment and were utilized to help develop an interactive educational tool was designed.

The educational tool was designed under the guidance of Malmö's Environmental Department, to connect elements of *awareness of environmental problems* to *practical* and *simple tips* to feasibly support behavioural change. This tool, which was catered to young persons,

utilized relevant data for the target group, as well as graphical images and vividly-communicated comparisons to grab their attention.

Via guidance of the literature review, various tactics were utilized to help increase the effectiveness of this tool, by first capturing students' attention and curiosity and then emphasizing feasibility of incorporating behaviour change. One of the primary barriers pointed out in the literature is the *perception* that environmental behaviours are overly difficult or impractical. Strategies utilized to influence participation included communicating effective messages to the target group, encouraging students to make written commitments regarding behaviours they could participate in, utilizing visual references to prompt behaviour, and providing various incentives to engage their participation.

Upon completion of the tool, high schools in Malmö and Lund were visited in order to assess the effectiveness of the method applied and its ability to motivate adoption of specific environmental behaviours. Students were first asked, via pre-surveys, as to their *current* environmental knowledge and corresponding behaviour, and if the factors considered in the literature held relevance in influencing their behaviour. Observational analysis also examined public infrastructure availability that facilitated choice alternatives and supported sustainable behaviour, i.e. safe biking paths and bike racks at their schools, etc.

Following the pre-survey, an interactive presentation (the educational-tool) discussed various environmental choices and the consequent environmental impacts of choice with students. This tool also shared practical advice as to how they can effectively reduce consumption and shift behaviour to more sustainable means, in simple ways.

The effectiveness of this tool was then evaluated via a post-survey, discussion and student interviews. These asked students if they *will* incorporate behaviour changes and *what type* of behaviour changes they will incorporate. Generally, students were receptive of the teaching tool and considered it an effective means to help them shift their behaviour, at least in small measures, via easy and *convenient* behaviour changes. Findings also generated some empirical materials as to factors and barriers which influence student participation in environmental behaviours or justification for non-participation. Barriers, according to students, included laziness, an over-reliance on technology to solve environmental burdens, a sense of limited responsibility (i.e. parents make their decisions) as well as a presumed lack of disposable income to afford environmental choices pertaining to food and product consumption.

According to students, an additional barrier often mentioned is the difficulty to fully *comprehend* the extent to which they, as individuals, impact the environment. Students stated that this was due to the seemingly *intangible nature* of many environmental problems. During the class discussion, it was pointed out to students how the decisions they make *do create an impact* and also specifically how *simple actions*, particularly in an urban environment, can reduce their personal environmental burden by utilizing public infrastructure and making improved choice alternatives in their product and food consumption.

Table of Contents

List of Figures
List of Tables

List of Figures

List of Tables

1 Introduction

With nearly half of the global population now dwelling in urban environments, we live in an urbanized society. This figure is even higher in Europe, with approximately four out of five Europeans living and working in urban areas (Wallström, 2006, personal communication). To support this urban standard of living requires 50% of all energy utilization and consumes up to 75% of all resources (ibid). Concentrating human populations intensifies environmental pressures, potentially triggering excessive and intolerable environmental damages related to resource extraction, energy production or waste emissions (Perlman, 2000). Cities then must cope with numerous challenges simultaneously: providing resources, housing, infrastructure, employment, safety and security, as well as mitigating pollution (ibid). Increasingly, urban systems cannot manage the growing demands of a rapidly urbanizing society or the evolving patterns of consumption and waste notorious to urban living (Jayne, 2006).

However, while rising urban populations do encompass logistical challenges to managing urban environments, they also offer opportunities. Through effective participation and planning, cities provide a platform for effective distribution of resources and managing environmental issues (Satterthwaite, 1999). Cities concentrate human populations, making resource and infrastructure allocation more effective (ibid). Dense settlement patterns in urban environments also help preserve open spaces for food production and nature preservation (Perlman, 2000). And while sustainability and the preservation of open lands are not the primary catalysts spurring urban growth; well-managed and concentrated living environments do provide opportunities to engage citizens and create sustainable solutions in an urbanizing world (Satterthwaite, 1999). Urban populations can invest in notions of sustainability in an effective manner simply because they have the populations to justify infrastructure investments. Cities also possess the required human capital to organize such investments in a proficient manner (Evans *et al.,* 2004; Satterthwaite, 1999).

Whilst certain challenges are common to urban atmospheres, how cities cope varies considerably depending on distinctive political, cultural, historical or climatic conditions and the populace that inhibit them (Landry, 2000). Accordingly cities, through the process of engaging their citizenry, have the ability to create unique solutions to curb localized environmental and social ills, catered to specific circumstance (Wates, 2000).

To maximize the benefits of urban living and minimize negative aspects, cities must perform a balancing act. On the local level achieving urban sustainability requires an appropriate physical environment and available infrastructure, as well as the involvement of citizens to participate in sustainable behaviour.

Citizens' participation in sustainable behaviour in urban settings validates provided infrastructure, investment and civic programmes the city has invested in (Selman, 1996). Involving urban citizens in various forms of participation can enhance interest in city programmes, promote a sense of ownership and stem a high level of environmental behaviour (Wates, 2000). Urban sustainability then, requires raising awareness of the public and encouraging their participation and engagement at different levels. The elements influencing participatory behaviour, viewed as a pertinent component of achieving urban sustainability, is the primary concentration of this thesis.

1.1 Why consider public participation in urban environments to stimulate behavioural change?

"When dwellers control the major decisions and are free to make their own contribution to the design, construction or management of their housing, both the process and the environment produced stimulate individual and social well-being."

-Thomas Jefferson, Architect and Third President of the United States

The idea of public participation in local governance is not a new phenomenon. At the core of democracy lies the fundamental value that government should be enacted for the people, by the people (Wates, 2000). While it may not be feasible or practical to maintain citizen involvement at every stage, involving citizens has many benefits to the larger governing process. It can restore trust in governmental procedures and resolve conflict by helping citizens understand the overwhelming challenging that local governments face (Loring, 2007). Incorporating public participation highlights the compromising role government must play to create a system and society that attempts to balance a wide variety of contradictory values. For example, the general populace in the United Kingdom agrees that increasing the percentage of renewable energy is good for the environment, society and to attain the established Kyoto Protocol targets. However, on the local level plans to achieve such targets are met with extensive citizen criticism from the *same people* that agree to such targets on a national level (ibid). Generally, there exists a wide range of NIMBY (Not in My Backyard) sediment as to the location of such infrastructure and the potential menaces, including localized pollution, odour or health impacts, that may accompany it (ibid). Public participation can inform citizens and involve them in creating policies that are appropriate for the wider public (Lund, 2000).

Beyond involving citizens to find policies supported by the public, public participation can help expand creativity as to how to tackle urban environmental problems or incorporate measures to improve urban sustainability. By incorporating public participation, urban governments can tap the varied skills, interests and backgrounds of the urban public and their viewpoints (Wates, 2000). Architects and environmentalists can bring different perspectives to urban planning. Teachers and school children can incorporate creative and different thinking patterns. Furthermore, involving citizens ensures public values are taken into account, and can help build a community's social norms and attitudes regarding environmental issues (Selman, 1996; McKenzie-Mohr and Smith, 1999). Of critical importance, public involvement can also help generate 'project identity' and a sense of ownership (Selman, 2001; Corbett and Corbett, 2000).

Incorporating public participation has received significant attention at the international level in recent periods as well. Following the 1992 Rio Convention, incorporating citizen participation has become a major policy objective at local and national levels.[1] Further, the 1998 Aarhus Convention attempts to link environmental and human rights via greater participation of the public and emphasizing the *right* to scientific and environmental

---

[1] The UN Conference of Environment and Development emphasized the importance of public participation in Principle 10 of the Rio Declaration (United Nations Environmental Programme, 1992). *"Environmental issues are best handled with participation of all concerned citizens, at the relevant level. At the national level, each individual shall have appropriate access to information… in their communities, the opportunity to participate in decision-making processes. States shall facilitate and encourage public awareness and participation by making information widely available…"*

information. It asserts that sustainable development is achieved only through the involvement of *all* relevant stakeholders (United Nations Economic Commission for Europe, 1998).[2] These and similar international agreements support local initiatives to incorporate participatory processes as an inherent component of sound democratic procedures.

1.2 Active and passive public participation

Public participation, as examined in this research, is generally undertaken in two fields which will be from now on referred to as *active* and *passive* public participation. *Active public participation* involves citizens as integral and invaluable members of urban planning: gauging their creativity, interests and perspectives.[3] In the environmental arena, active public participation includes: crafting new strategies concerning situating an incoming public facility, or the specific nature of infrastructural alternatives for managing waste, transport or energy (Lund, 2000).

Incorporating active public participation can be challenging, particularly in initial phases. It is often difficult to attract interested citizens, inform them of the particular issue at stake and ensure their commitment throughout the process (Alberts, 2007). Moreover, it is often difficult or impractical to incorporate all citizen recommendations into models of community planning. However, while barriers to implementation exist, active public participation is becoming an increasingly incorporated phenomenon. It is deemed valuable as a form of participatory democracy in its truest sense and if incorporated effectively, can lead to wider acceptance of policies and programmes (Evans *et al.,* 2004).

While engaging citizens can help design innovative urban programmes and policies, effective implementation of such policies in fact *requires passive* public participation and the involvement of the citizenry. Case in point, many of the foremost environmental problems today, particularly in an urban setting, could be mitigated with best available technology. However, such technological advancements will have limited capability of reducing environmental impacts without the public adopting essential levels of participation in sustainable behaviour[4] and *using* such technology (Wates, 2000; Selman, 1996). *Passive public participation* attempts to engage the citizenry in sustainable behaviour in various activities set forth by urban governments.[5] The extent to which residents passively participate can serve as a measurement of effectiveness (Loring, 2007; Harrison *et al.,* 2007).

Beyond choice, public participation also involves available access to information. And in many cases, local governments do not only provide access to information upon request, but invest in extensive information campaigns to *build awareness* and *inform* the public regarding the significance of policies and initiatives pertaining to sustainability (Loring, 2007).

---

[2] The 1998 UNECE Convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters, or the Aarhus Convention emphasizes the interactions between citizens and public authorities in negotiating, implementation and participating in environmental policies and programmes (UNECE, 1998).

[3] Active public participation engages citizens to help plan public spaces to best suit active and integrated communities, by stimulating interaction and celebrating the various interests that define a local community (Landry, 2000).

[4] Throughout the thesis, the terms environmental behaviour and sustainable behaviour are used interchangeably.

[5] Examples of sustainable behaviour include: separating municipal waste, taking public transportation, improving home energy efficiency, or by purchasing more sustainable forms of energy.

1.3 Linking knowledge and behaviour in passive participation

"The difference between what we do, and what we are capable of doing, would suffice to solve most of the world's problems."

-Gandhi

Even with extensive investments in information campaigns, such programmes do not always manifest equivalent behaviour change (Alberts, 2007; Tanner, 1999). It may not be enough for people to *know*; there is often a *missing link* between the element of theoretical knowledge and a consequent action or behavioural change. Thus, this research was undertaken in order to attempt to understand why some programmes are effective in triggering sustainable behaviour change and others are not. While each case has its own distinct circumstances and context, past researchers have developed analysis through study and observation as to the extent to which engaging public participation is an effective tool to promote sustainable behaviour. Previous analysis also examines potential barriers to behavioural change. This research will attempt to build upon such analyses, and apply it to a localized case study examining the link between knowledge, perception and behaviour. How can we effectively connect knowledge and behavioural change elements in passive participation? As a suggestion an educational activity for students was conducted to examine what *current* levels of environmental awareness and behaviour are, and investigate what *triggers* further engagement in environmental behaviour.

Many overlapping factors influence a citizen's participation in environmental behaviour. Amongst these is first the level of awareness or access to information. However, information alone is not enough to influence positive environmental behaviour (McKenzie-Mohr and Smith, 1999). Beyond information, environmental behaviour is supported by assorted factors including attitudes, incentives, access to infrastructure, norms and cultural values, as well as safety and convenience. These and other aspects, as well as related barriers, are fundamental elements of the thesis research and are covered to a greater extent in Chapter 2, the literature review and later examined in the case study.

1.4 Purpose and Objective

The aim of this research is to contribute to the understanding of factors influencing environmental behaviour. A specific objective was to analyze *current* environmental awareness amongst young persons in Malmö and Lund and if this influences their behaviour. This research also aims to identify relevant barriers specific to the case study. It is expected that the results of the research will contribute to an on-going project of *Malmö's Miljöförvaltningen* (Malmö's Environmental Department) to create an interactive tool catered towards youth to motivate reduced energy consumption. Thus, the research provided an opportunity to visit classrooms and discuss with students, pilot a potential tool and evaluate its effectiveness. When this environmental communication tool is later enacted in Malmö; the research will provide a baseline to find out what students *already* know and do, and if such an interactive method is an influential link to their behaviour.

1.5 Research Questions

The above aim leads to the following research questions:

- What is the existing knowledge on the subject of participation in sustainable behaviour?

- What factors influence the participation of youth in Malmö and Lund in sustainable behaviour?

- In light of various influencing factors, what is the role of a one-time educational campaign to trigger behavioural change by connecting *knowledge* with feasible actions to reduce environmental impacts?

- Within an urban setting, how does the physical environment (available infrastructure) influence participation in various environmental behaviours or provide choice alternatives?

1.6 Scope and Limitations

The study focuses on various motivational factors to participation in sustainable behaviour. While industry, business and civic organizations should also participate in sustainable behaviour; this research primarily considers household behaviour, focusing on youth as an easily accessible target-group. Particularly examined is the *link* between awareness and participation for young persons living in a semi-urban setting of medium population-density.

High school age youth were the target group considered in the research against which data was tested and analyzed. Youth are a valuable target group to consider on many grounds. They are a social group with a high level of interaction and may contain a reservoir of social capital within a particular school setting. As students *are required to be* in school and are in the process of learning, they can efficiently take in and spread information to family and friends, and the corresponding community. Young persons are an 'untapped' resource as they generally have less responsibility, more free time and are in a social learning environment *already* which can provide an attentive, energetic audience. They are young and less conditioned by experience, but more vulnerable to manipulated messages as their experiences are still being formed.[6] Thus, interacting with youth can shape environmental perceptions and potentially plant a future interest. From a practical point of view, this target group was also chosen because of easy accessibility, and to provide findings for Malmö's Environmental Department as explained further below.

The study addresses how environmental knowledge, presented in a vivid and interactive manner (via strategies described in the literature review) can potentially trigger consequent levels of increased participation in the environmental behaviour amongst youths. Specifically it combined the element of *knowledge* with specific *actionable* items.

The research examines various factors influencing sustainable behaviour in an urban context, recognizing that sustainable behaviour in rural environments is governed by differing parameters and infrastructural considerations. Primarily categories of sustainable behaviour and their influences included: behaviour related to *energy consumption*, *transportation* alternatives and *waste separation*. The research examines motivational factors that influence sustainable behaviour, including knowledge, infrastructure, and experience in urban environments, as important factors in fostering sustainable behaviour.

---

[6] Research finds that our behaviour and attitudes are shaped when we are children or adolescents (Lindén, 2007, personal communication).

The main urban environments considered in this study are Malmö and Lund, situated in Skåne, the south of Sweden. These urban environments were considered due to reasons of accessibility for observation and interviews. Furthermore, in coming months *Malmö's Miljöförvaltningen* (Malmö's Environmental Department) will incorporate a programme pertaining to environmental behaviour alternatives. Thus, the thesis period provides an apt opportunity to check and evaluate present environmental knowledge and consider methods of examining if knowledge influences consequent participation in behaviour amongst youth in Malmö and Lund.

Apart from the practicality of the location and functionality of the analysis platform, Sweden is a nation in which laypeople display a generally high level of environmental awareness (Ingebritsen, 2005). Urban infrastructure facilitates potential environmental behaviour by providing choice alternatives. Furthermore, environmental concerns receive significant public attention.[7] There also exists a high level of published environmental information regarding local initiatives accessible to the public, if it chooses to do so.[8] Thus chosen locations provide an interesting opportunity for observing the *link* between various factors contributing to urban sustainability: the level of environmental knowledge *already* present, the interaction with infrastructure and community, *and* if this influences consequent behaviour.

Three case-study schools in Malmö and Lund provided the arena by which to analyze behaviour. Additional schools were contacted to participate in the research, but the analysis fell close to the end of the academic year and it proved difficult to find appropriate time slots for teachers and students. Some teachers were available, but not until later in the school year, after the research period was complete. Further research may be conducted if deemed useful for Malmö's Environmental Department.

Environmental knowledge and behaviour was tested via surveys and questionnaires directly before and after the incorporation of the interaction period to see if immediate changes pertaining to behaviour or awareness increased. Research in the literature review will demonstrate how the role of knowledge and its impact on shifting behaviour changes over time due to temporal discrepancy (Kollmuss and Agyeman, 2002). However, due to the time limitation, a long-term evaluation of the programme could not be implemented. Furthermore, awareness is only one of many factors to influence behaviour (McKenzie-Mohr and Smith, 1999). Thus, the analysis primarily examined the role of social norms and current awareness *already present* amongst youth in Malmö and Lund and if the strategy applied is an effective method to provoke change or stimulate increased environmental behaviour.

Background research regarding barriers to environmental behaviour as well as methods and strategies used to develop the interactive education tool may be applicable to similar studies examining behaviour change. Further the methodology applied to implement the case study, as described in Chapter 4, may prove replicable. However, findings of the case are influenced by *localized* factors including previous environmental awareness and education, as well as cultural values and availability of infrastructure to facilitate behaviour. As barriers and

---

[7] Observation of the author based on examination of the urban environment and also via watching environmental broadcasts and advertisements on television radio programming new media in spring 2007.

[8] Both the Lund and Malmö Environmental Departments provide extensive information about the local and global environment, energy and product consumption suggestions and alternatives and local-area programmes. Such information is displayed at entrances. When asked, it was mentioned that such information is free and available for the public to take upon visits to the department, or will be sent to citizens upon request. Such information is also available on municipal websites (Lund and Malmö Websites, 2007; Zinkernagel, 2007, personal communication).

opportunities influencing environmental behaviour are case specific, research findings are primarily applicable to similar studies regarding behaviour of young persons in Malmö and Lund or cities in a similar context.

1.7 Research Approach and Methodology

The initiation of the research focus stemmed from an interest to study primary factors necessary to incorporate sustainability in an urban environment. Two primary factors were considered as critical component to achieve sincere sustainability: *space and infrastructure* (city design, architecture, technology, etc.) and *people* (incorporated through participation, information and behaviour.) Amongst these, *participation in environmental behaviour* was examined in this research.

Following the first question, a literature review was conducted to study factors and specific barriers influencing citizen participation in environmental behaviour. The literature review provided the theoretical framework by which to incorporate participation in environmental behaviour in Malmö and Lund, and the analytical framework to evaluate its effectiveness. Sources examined include books and journal articles pertaining to environmental psychology and sociology which discussed barriers and motives to sustainable behaviour. Other topics included commutation theory, evaluation techniques, urban governance, and community planning. Interviews with field-experts in environmental behaviour, public space and urban infrastructure provided insight for the literature review and advice to analyze findings. Further, conferences attended *prior* to the thesis period provided contacts and information that helped via the research technique, snowballing.

As the thesis research focused on participation in Malmö and Lund, these two cities were subsequently studied. Several meetings and interviews were conducted at Malmö's Environmental Department, and in a previous research study, at Lund's Environmental Department.[9] These provided insight and understanding of environmental communication strategies, current programmes and aims of these two cities. Parallel to the examination of the current situation of these two cities, an educational activity pertaining to environmental choice and sustainable behaviour was designed, under the guidance of Malmö's Environmental Department as well as literature related to implementing behaviour change.

A draft version of this interactive tool was created for Malmö's Environmental Department and piloted with data gathered during the thesis period. High schools in Malmö and Lund were visited and the information was presented in an interactive manner to inform and engage students. The educational activity, described in Figure 1-1, was created to illustrate environmental impacts, including energy consumption in various stages of an average day. Data relevant to Malmö and Lund was gathered from various sources: European Union reports, articles and interactive internet games in Swedish and English and data from local Environmental Departments. This supported what was discussed in the interactive activity.

---

[9] Review of various programmes in Lund was undertaken for a previous course entitled *Strategic Environmental Development* in fall 2006. This course was conducted in group format along with Lovish Ahuja, Elena Koritchenko, and Gireesh Nair.

Wake-up (Energy consumption in the night, while sleeping)	→	Taking a Shower Getting Ready (Energy consumption)	→	Eating Breakfast (Environmental impacts of food and drink choices)	→
Transportation (Energy consumption and other environmental impacts)	→	Classroom (Energy consumption and other environmental impacts)	→	Lunch (Environmental impacts of food and drink choices)	→
Free-time Activity (Energy consumption and other environmental impacts)	→	Housework (Energy consumption and other environmental impacts)	→	Dinner (Environmental impacts of food and drink choices)	

Figure 1-1: Basic framework for interactive presentation activity with students

Additional reading was conducted to cater and communicate to youth, offering insight as to how to reach the specific target group. Strategies, including *community-based social marketing* and *empowerment evaluation,* provided tips as to how to implement the research tool.[10] Extensive photographic imagery, taken in Malmö and Lund, were utilized to exemplify the impacts of consumption on the environment. Thus, the programme was designed to help students *comprehend* the impacts of their choices and compare how improved environmental choices can reduce environmental impacts. It also gave suggestions of easily-applied measures of change.

Once the tool was completed, it was tested in four different classrooms in three high schools, or *gymnasier,* in Lund and Malmö. The participating students attend three distinct educational backgrounds: natural science, social science and vocational sciences. The diversity of their educational specialization and the social norms governing their schools and educational studies were considered when analyzing the data findings. These diverse, but comparative settings provided interesting results, as will be discussed in Chapter 5.

The case studies followed a sequential approach. First, observational techniques noted available infrastructure to support environmental behaviour in the schools visited. Several days prior to the workshop, teachers were interviewed pertaining to their perception of students' environmental awareness and education, as well as observed behaviour. This allowed the interactive educational tool to be catered to the specific classes.[11]

---

[10] Empowerment evaluation, discussed in Section 2.3.5 is designed to *help people help themselves* or in this case, participate in various behaviour alternatives (Fetterman, 2001). Community-based social marketing follows various steps, discussed in Section 2.3.3.

[11] Interviews with students, teachers and field experts in Malmö and Lund were carried out in person and were of a qualitative nature. Collection of similar background data amongst the school environments ensured comparable results

The classroom visit involved several steps, as described in Chapter 4. This provided various means of data collection for subsequent evaluation. As understanding actual awareness cannot be analyzed via a 'yes' or 'no' response, students filled in information about their awareness and corresponding behaviour in daily activities. This was done via an open-ended survey; see Appendix 1. Primarily results in the pre- and post-survey reflect qualitative results, as do student interviews. The post-questionnaire followed a more quantitative methodology asking if such a method would stimulate behaviour change in students; Appendix 2. This was undertaken to see if the communication method was effective. Students were encouraged to respond, in an open-discussion regarding what factors influence their energy-consumption or related environmental behaviours. The discussion format attempted to make students feel 'involved' in the process of the research via discussion and interaction, according to methods of empowerment evaluation (Fetterman, 2001).

In order to understand the effectiveness of the teaching tool in enhancing sustainable behaviour, data collected in the case study visits were subsequently analyzed. Following the logic of effectiveness evaluation (Vedung, 1997)[12] the thesis examines the following aspects: i) the factors influencing *current* student behaviour and the perceived *barriers* to participation; and ii) whether or not the created educational tool was effective in communicating and influencing increased participation in environmental behaviour.

Regarding the former, the data collected in the case-studies was evaluated against the background literature to understand factors and barriers influencing the current behaviour of young persons in Lund and Malmö. It is recognized that these factors can either support or provide constraints to environmental behaviour outside of the applied intervention (i.e. the educational tool to support behaviour change). Concerning the latter, the effectiveness of the teaching method utilized during the thesis research was evaluated based on the responses of students (77 responses were received from students). Evaluation of the teaching tool to determine the effectiveness of the method utilized may also provide insight as a *pilot study* before a similar interactive tool is later created in Malmö.

1.8 Thesis Outline
The structure of the thesis is described below:

Chapter 1: Introduction

This chapter introduces the role of public participation in environmental behaviour as an essential element to achieve sustainability in urban areas. It introduces the target group, young persons in Lund and Malmö, by which background research is applied and thesis analysis undertaken. Chapter 1 also includes the aim and objectives, research questions, scope and limitations, as well as the methodology by which the analysis was conducted.

Chapter 2: Primary factors influencing participation in sustainable behaviour: A literature review

This chapter describes past research regarding factors influencing environmental behaviour and specific barriers to be overcome. It also includes strategies to enhance participation, specifically emphasizing those utilized during the implementation of the case-study research.

---

[12] Effectiveness evaluation entails two aspects: *attainment of the goal* and *attributability* of the findings. It aims to determine if the methodology employed, (in this case, that which was used in creation of the teaching tool to induce behaviour change) was effective in attaining the goal (Vedung, 1997).

Chapter 3: Description of case cities: Choice Alternatives and Participatory Behaviour in Malmö and Lund

This chapter presents the current situation in Malmö and Lund, as well as an introduction to various programmes incorporated in these two urban environments.

Chapter 4: Development and Implementation of the Teaching Tool

This chapter describes the process by which the research was conducted, and the justification for such a method.

Chapter 5: Analysis and Evaluation

The theoretical perspectives presented in the literature review are applied to the case study to examine if factors identified in past studies influence environmental behaviour in youth in Malmö/Lund. It also evaluates the effectiveness of the method utilized in Chapter 4.

Chapter 6: Conclusions

This chapter concludes by presenting various findings as well as recommendations for future research and implementation of such a programme/research.

2 Primary factors influencing participation in sustainable behaviour: A Literature Review

Expanding on the introduction, the literature review presents existing research regarding factors influencing citizens' participation in environmental behaviour. In order to understand the interaction between *how* and *why* people participate in environmental behaviour, several academic disciplines (and field-experts) were consulted. Amongst these are included: environmental psychology and sociology, urban planning, and youth education. These disciplines discussed influences to environmental behaviour, offered suggestions to support greater participation in sustainable behaviour, and suggested how to create a physical setting by which to support improved choice alternatives.

The purpose of the literature review is two-folded: it aimed to identify factors that influence citizens' participation in environmental behaviour, *and* to gain an understanding on effective communication mechanisms. The former is used to analyze the cases and is discussed in sections 2.1 and 2.2. The latter, discussed in section 2.3, was considered whilst developing the teaching materials to effectively communicate and is.

2.1 Factors influencing participation in sustainable behaviour

A range of complex interactions influence our relation to the social and ecological environment, our understanding of consequent interactions and accordingly, our *behaviour* and level of participation. How and why people participate is shaped by what can generally be understood as *internal* and *external* factors (Nyborg, 2003)[13]. *External* motivation refers to physical infrastructure, as well as institutional, economic, social and cultural influences (Kollmuss and Agyeman, 2002). *Internal* motivation is influenced by values, attitude, emotions and environmental awareness (ibid).

2.1.1 News media, information campaigns and visibility

In order to move environmental problems from a conditional state to a public concern and build the foundation for participatory behaviour, *visibility* in various forms of media is crucial (Hannigan, 1995). The majority of laypeople depend on media to make sense of the seemingly bewildering inundation of information pertaining to environmental risks, technology and initiatives (ibid). Without media coverage, it is unlikely that any predicament, environmental or otherwise, will enter into the arena of public discourse, capture public attention, or become part of the political process. Consequently, upon receiving information, the media may *indirectly* shape behaviour. Central to the decoding of media texts is appropriate visual imagery, sound, language and the stemming sense of curiosity it can build (ibid).

Understanding the role of media in constructing a sense of urgency or pending environmental crisis is pivotal in shaping society's environmental concerns (Harrison *et al.,* 1996). Many studies demonstrate that the rise or fall in media coverage regarding a particular

---

[13] Various authors have studied similar factors, but categorized and identified them in various, but inter-changeable ways. For example, Nyborg (2003) refers to *internal* and *external* factors, while Stern *et al.* (1999) refer to *personal* and *contextual* factors. Subsections have attempted to portray what these factors are actually trying to depict.

environmental debate likely follows with a causal effect in the rise or fall of risk perception or public concern (ibid). Consequently, public opinion is highly susceptible to media coverage.

However, there exists a fine line of how media can be a positive factor influencing environmental participation. High media coverage can build high awareness; however *over-saturation* of a particular issue can create information overload or result in a depressed or negative attitude regarding a particular issue (ibid). Overwhelming the public with negative information will not stir participation, but breed the conditions for despondency or denial (Harrison *et al.*, 1996; Tanner, 1999; Alberts, 2006).

The role of media as an *agent for change* to motivate environmental education and policy agenda-setting is complex and contradictory for many reasons (Hannigan, 1995). Media attention can also play a significant role in *socially-constructing reality* behind principal environmental problems and how best to set forward. Media as a discourse is a process by which journalists and other cultural entrepreneurs develop and crystallize meaning and reality in public discourse (ibid). Media *does* play a role in getting information to the public. However, the idea of news as a part of a 'constructed reality' by which journalists define and redefine social meaning and values, and treat news-making as a collaborative process of negotiating stories, highlights the conflicting role of media in society (ibid). Depending on the subjectivity, media can generate a *lack of trust* in government and policy or *confusion* and *uncertainty* regarding the 'mixed messages' coming from science or environmental reporting. Statements that offer changing or contradictory recommendations can create frustration or resignation to corresponding patterns of behaviour (Tanner, 1999; Alberts, 2006).[14]

Accompanying news media, information campaigns provide a valid foundation by which to build awareness (Milfont *et al.*, 2004). They increase visibility to an issue, curiosity and awareness regarding broader environmental agendas. Distributing information comes in various forms, especially with enhanced means of modern communication.

2.1.2 Experience as an influence to behaviour

However, while awareness is a vital factor to foster environmental attitudes and behaviour, it is now widely accepted that there does not exist a direct correlation between awareness, provided by information, and behaviour (McKenzie-Mohr and Smith, 1999; Tanner, 1999; Pruneau *et al.*, 2006). Further, for behaviour to be adopted and *perceived* barriers minimized, environmental information cannot only be *theoretical*, but also offer *practical* suggestions (Lindén, 2007, personal communication).

Experience can link *theoretical* information via a *practical* encounter and provide insight by which to incorporate environmental behaviour (Lindén, 2007, personal communication). Experience can shape our environmental behaviour in two ways. First, experiences can demonstrate the relative *feasibility* of incorporating sustainable behaviour and make information concrete (ibid). Secondly, Kollmuss and Agyeman state that experience can instil a personal encounter, or *connection* to an issue, which can also shape our behaviour (2002). Direct experiences tend to have a more impacting influence on our behaviour than indirect (ibid).

---

[14] Thus, *depending* on the level of scientific validity and integrity, news media is a positive factor providing information and indirectly influencing laypeople's environmental behaviour or a negative factor catalyzing mistrust, animosity or complacency.

Childhood experiences in nature, witnessing pro-environmental behaviour in our family or organizations, our role models, as well as an encounter or witness of destruction can influence behaviour (Kollmuss and Agyeman, 2002). Extending this idea further, Jaeger *et al.* stated that behaviour may change depending on perception of risk, immediateness or a *direct connection* to a potential environmental harm (2000). Experiencing environmental challenges, including catastrophes or disasters, amplified resultant of human-induced harms can also help shape corresponding behaviour (ibid).

2.1.3 Norms and cultural values

Normative influences examine the role of social norms, family values, as well as cultural and religious customs (Stern *et al.*, 1999).[15] Evidence, particularly related to the discipline of environmental psychology, demonstrates that *society looks to the behaviour of others* to determine how to respond (Kollmuss and Agyeman, 2002; Carlsson-Kanyama *et al.*, 2004). Norms consequently influence behaviour by demonstrating how one should act, or not act, in a social setting (Kollmuss and Agyeman, 2002; McKenzie-Mohr and Smith, 1999; Lindén, 2007, personal communication).

Social norms illustrate what is approved or disapproved by others, and *moral norms* are internalized norms that determine what is perceived as right or wrong (Nyborg, 2003). A moral norm could not be internalized unless a social norm was present beforehand (ibid).

2.1.4 Demographic influences and generational foundations

Demographic factors, including income, education level, home ownership or location can also influence environmental behaviour. Perception regarding the *relationship* to the natural environment and the sense of *environmental relevance* or responsibility can vary between urbanites and rural dwellers (Herbert and Thomas, 1997; Lindén, 2007, personal communication).

Literature also indicates that women are often found to have a higher level of participation in environmental behaviour than men, whist men are more encouraged to implement technological changes to reduce environmental burden (Kollmuss and Agyeman, 2002). Further, persons with a higher level of education are commonly more apt to participate in corresponding environmental behaviours and choice alternatives (Kollmuss and Agyeman, 2002). In a Swedish study, *middle-age educated women* were found to be the most conscious and active group in corresponding environmental behaviours, while young men were found to be the highest energy consumers (Lindén, 2007, personal communication).

There are many explanations as to the influence of demographic factors. Justification includes awareness, responsibility or ability to invest additional time and financial resources into environmental behaviour (Kollmuss and Agyeman, 2002).[16] However, in numerous studies, demographic factors maintain similar influence in societies of like-affluence (Kollmuss and Agyeman, 2002; Stern, 1999; Lindén, 2007, personal communication).

---

[15] Cultural norms vary depending on situation or perception. Beyond national cultural, other normative influences include the local environment in which we live, and various traditions associated to work or school as well as cultural influences of leisure and past-time alternatives.

[16] When asked, environmental activists responded that they performed *responsibility* because of their understanding of the issue, *as well as* their privilege or duty. This was found to often connect to demographic situation (Harrison *et al.* 1999). This *privilege*, as it was viewed, led to self-ascribed responsibility.

Our behaviour is also influenced by generational factors which can shape *accessibility* to resources and technology (Carlsson-Kanyama *et al.*, 2004; European Environmental Agency, 2005). Carlsson-Kanyama *et al.* examined attitudes and behaviour according to electricity consumption of younger and older generations (2004). This study found younger generations, who possess a wider access to technologies *already* in childhood and adolescent periods, consume significantly higher amounts of energy than previous generations (ibid).

Research also found that many of these underpinnings which mould our perceptions and corresponding behaviours are formed during childhood or adolescence and maintained through life (Lindén, 2007, personal communication). For example, older generations often save wrapping paper to *reuse* it again, but may not perceive such actions as 'environmental' but more as an *obvious* behaviour (Lindén, 2007, personal communication).[17]

2.1.5 Beliefs, attitude, and emotional involvement

In the realm of what Stern *et al.* refer to as the personal domain, are included an individual's basic attitudes and personal values, how they *perceive* the biophysical environment functions and how *consequently* it responses to human actions (Stern *et al.*, 1999).[18] Stern *et al.* state that if internal factors are positive, as well as access to external factors (i.e. infrastructure), this can facilitate consequent participation in environmental behaviour, as described in Figure 2-1.
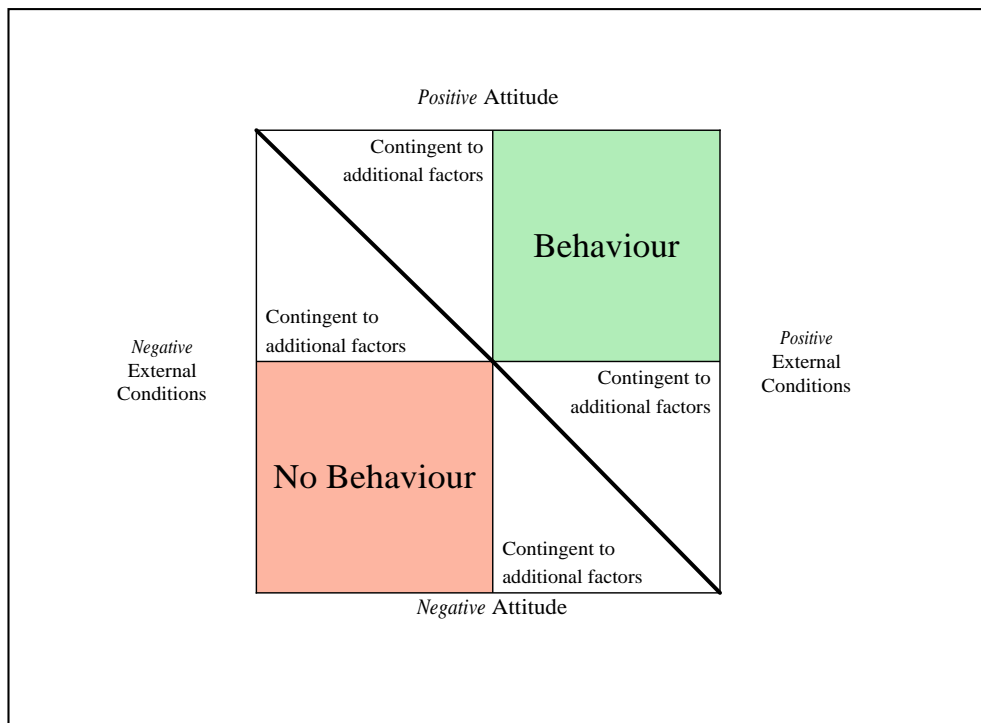
Figure 2-1: The correlation between the personal and contextual domains and its influence on behaviour

---

[17] Connecting the factor of experience, Lindén stated *if* younger generations witness this *simple behaviour* it can influence their perception of the value and simplicity of enacting *practical* behaviour related to reuse (2007, personal communication).

[18] *Perception* is influenced by environmental education, media programming or experience (Kollmuss and Agyeman, 2002).

Source: Adapted from Stern et al, 1999

Stern *et al.* (1999) also mention that there are *unique factors* affecting engagement in behaviour that may not be included in Figure 2-1. The aspects shaping participation are behaviour-specific and influenced by choice alternatives of an applied context (McKenzie-Mohr and Smith, 1999).

Further, while attitudes are necessary to shape environmental behaviour, they are only an indirect influence, mediated by the factor of intention (Tanner, 1999). Environmental attitudes can shape behaviour depending on the *emotional involvement* of a specific individual. An emotional connection to the natural environment can consequently foster environmental behaviour (Pooley and O'Conner, 2000).[19]

2.1.6 Responsibility, efficacy and altruism

Responsibility and morality are other internal factors which can help *obligate* positive environmental behaviour (Kaiser and Shimoda 1999). *Responsibility* refers to the notion of 'locus of control' or the belief (or non-belief) that a single individual can influence the larger environmental situation or take corresponding responsibility for the existing state of environmental deterioration (Kollmuss and Agyeman, 2002; Pooley and O'Conner, 2000). E*fficacy*, or a strong internal locus of control, expressed in a self-ascribed form of moral responsibility to society or the environment, can influence ecological behaviour because such persons *believe they can* bring about change.

Someone with a lack of efficacy or internal responsibility may suffer from a feeling of impotence or become overwhelmed as to the intractable nature of environmental problems (Kaiser and Shimoda, 1999). Another outcome is denial due to the current state of environmental degradation (Kollmuss and Agyeman, 2002). Accordingly, the justification for non-behaviour can stem from hopelessness, or a *lack of personal responsibility*, as to the meagre ability a single individual has to *impact global environmental problems*. Lacking efficacy can occur because it is *difficult to grasp* the impacts or improvements of a single individual.

Stern and his colleagues have developed a *Value-Belief-Norm* (VBN) Theory pertaining to how these elements interact in the personal domain and affect the individual's level of support for social or environmental movements, or specifically the notion of related behaviour (1999). The VBN Theory holds that supportive behaviour depends on an individual's positive *acceptance* of key values shared by a movement, (in this case environmentalism). It is essential that an individual *believes* that particular environmental harms, influenced by their behaviour, can threaten common values in a society (Stern *et al.*, 1999). Anyone holding similar beliefs has a sense of *personal moral obligation*. However they also note, personal actions regarding environmental behaviour are influenced by contextual factors falling outside the personal domain, i.e. infrastructure, availability, etc. (ibid).[20]

Stern *et al.*'s VBN Theory is an extension of what Schwarz calls *altruistic behaviour,* or the moral norm of activation (Stern *et al.*, 1999; Schwarz, 1977; Thogersen, 1996). Altruistic

---

[19] Emotional connections to nature or the environment are often stimulated through personal experience, culture, religious influences or via emotional media-communication (Pooley and O'Conner, 2000; Kollmuss and Agyeman, 2002).

[20] Stern *et al.* state that there are a unique set of capabilities and constraints affecting the likelihood of any individual to engage in a particular environmentally-relevant behaviour that may not be included in the VBN Theory (1999).

behaviour is a *pro-social* behaviour that is voluntary in its intentions and results in benefits received by another, even if this involves personal sacrifices to the individual (i.e. time, money or opportunity). In the case, it is the environment that could benefit from such a relationship (Kollmuss and Agyeman, 2002; Thogersen, 1996).

The motivation for altruistic behaviour is unspecified, but generally altruism increases when a person becomes *aware* of another's suffering and at the same time *feels responsible* for it.[21] Such an attitude can have positive repercussions for consequent environmental behaviour. Similar to Schwartz, other researchers state that for an individual to act environmentally, they must *focus beyond themselves* and be concerned about the community at large (Kollmuss and Agyeman, 2002; Thogersen, 1996).

Shaping altruistic orientation can depend upon three different types of orientation interacting concurrently: social, egoistic and biospheric orientation (Stern *et al.,* 1993). *Social orientation* is concerned with the removal of suffering of people. *Egoistic orientation* is concerned with the removal of suffering of the self. Thirdly, *biospheric orientation* is concerned with the removal of suffering from the non-human world (Stern *et al.,* 1993; Kollmuss and Agyeman, 2002). Stern *et al.* (1993) propose that the interaction between these three factors shapes motivation for environmental concern and consequent behaviour, as depicted below.[22]

V (egoistic orientation) + V (social orientation) + V (biospheric orientation) =Motivation

2.1.7 Social Capital

Social capital is referred to as the *glue* which holds communities together (Sellman, 2000). It draws on interactions of knowledge and identity and the quality of internal-external relations within a community. In modern society, the nature of community is quite complex. It is common to form several different categories of community that both shape our social interaction, and potentially influence our behaviour (Wiberg, 2007, personal communication). Such communities are referred to as communities of place, communities of interest and communities of consumption (Sellman, 2000).[23]

In a globalizing world of movement and exchange in which many of our communities are de-localized, significant portions of society may feel *stronger attachment* to their own transnational communities, than to the urban community in which they dwell (Evans *et al.,* 2004; Landry, 2000). Incorporating the public in local level decision-making that reflects dynamic and evolving public values can foster new resources of social capital and a consequent sense of community identity and ownership (ibid). High levels of social capital can influence cooperation and trust in a community. Further, increases in social capital can (in some cases)

---

[21] Factors influencing altruism can include: demographic circumstance, level of knowledge, emotional-connection or experience which shape perception and consequent moral or voluntary intention (Harrison *et al.* 1999).

[22] Egoistic orientation is found to be the strongest orientation, followed by social and finally, biospheric concern (Stern *et al.,* 1993). Thus, in some senses, Stern *et al.* contradict the altruism hypothesis mentioned above since they claim that the stronger the egoistic orientation, the stronger the motivation for behaviour. Accordingly, egoistic orientation can act as a motivator for pro-environmental behaviour as long as the action serves the person's various needs and wants (Kollmuss and Agyeman, 2002).

[23] Evans *et al.* (2004) categorize two types of social capital now exist: *place-based* social capital and *function-based* social capital.

curb losses in eco-capital and reduce the risk of vandalism (Sellman, 2000).[24] Social capital thrives on the interaction between institutions and local citizens and can create synergies between official and unofficial knowledge (ibid).[25]

A significant challenge to creating social capital in modern society is the role of urban 'sprawl' which has the ability to disrupt community ties (Evans *et al.*, 2004). Mobilizing communities have also appeared to boost civic disengagement. Further, a larger range of home-based activities, as opposed to public activities in public space, can decrease civic activism and decrease collective activities (ibid).[26]

However, researchers state that if social capital exists, it can be re-awakened even if it is in a dormant state (Sellman, 2000). In a society seemingly more and more detached from the surrounding place-based environment human interaction and an emphasis on public participation can re-ignite the vitality of social capital as a resource to initiate environmental behaviour (Wiberg, 29 March 2007).

2.1.8 The physical environment, community identity and public space availability

Supporting the discourse of social capital, another factor to influence public participation in sustainable behaviour is *identity* to city and community, facilitated through public space.[27] Internally and externally our perception of how much control we have to influence our behaviour is largely connected to our *sense of community* (McKenzie-Mohr and Smith, 1999) *Identity* to a place can have a positive impact and create the preconditions for establishing civic pride, community spirit and the necessary capacity to foster civic participation in environmental behaviour (Landry, 2000). Evolving cultural identity, particular to a specific location can be a motivating factor to influence the effectiveness of incorporating participatory behaviour within a community.[28] Landry also states that community identity and distinctness provide the anchor and roots within a city (ibid).[29]

---

[24] A popular view amongst environmentalists is that widespread and spontaneous participation is only able to occur when there are already deep reservoirs of social capital (Sellman, 2000). If such reservoirs run dry, there exists less enthusiasm in a community to participate in environmental behaviour (ibid).

[25] While social capital is an under-examined resource, some authors state that there is a risk of social capital being labeled as the panacea, or magic cure, for all social ills (Evans *et al.*, 2004). It is important to understand the broader notion of civil society and the various factors that influence its interactions including social, economic and political activities that take place in and outside of government (ibid). Despite its limitations, social capital, like human and economic capital, offers a resource which in the case of social capital, exists through the structure of fostered relationships.

[26] Gehl noted that more and more of our physical space is privatized and this reduces the sense of community to our surrounding human and natural environment. We interact less in public spatial spheres and more in either semi-private landscapes or in private yards and gardens. Furthermore we spend more of our time in the virtual sphere in what psychologist Sherry Turkle calls an identity to computer culture that has produced passion, dependency and profound connection with a digital artifact (2004).

[27] Research in environmental psychology suggests that the physical environment is a strong contributor to corresponding behaviour (Bell *et al.*, 1996).

[28] Pocket-communities in different parts of the urban environment may experience unique identities to space as well as localized norms and culture. As such, these factors influence the behaviour of different target groups; albeit in varying ways (Landry, 2000).

[29] Bäckstrand stated 'place based knowledge' can help foster identity, specifically in a moving and changing society (2003).

Public space provides a physical sphere to *re-connect* to community and culture. Public space stimulates identity to the surrounding landscape, enhances social capital and supports informal or formal interaction via a platform to stimulate discourse (Landry, 2000; Gehl, 2007, personal communication). Jan Gehl has stated *that first we shape the cities and then they shape us* (2003). The spatial environment and public city structures offer an informal meeting space that can help foster a sense of identity or *interaction* experienced by a community (Landry, 2000; Hesselgren, 1975). Corbett and Corbett examine the role of space to provide *planned* or *unplanned exchange*, as an incorporating effect between the physical environment and the psychological expression it creates for us (2000). Jan Gehl stated that public space and *life between buildings* offer an arena for necessary, social and optional activities (Gehl, 2004). The greater the space availability, attractiveness or appeal of open space, the more they influence the opportunity for chance interaction (Porteous, 1996).[30] This demonstrates how public space offers an arena for interaction and can influence norms leading to an improved environmental behaviour.

Beyond offering informal or formal meeting spaces, the spatial environment offers an arena of discovery; a location to build upon community experiences engrained in either the urban society at large or in individuals (Landry, 2000; Hesselgren, 1975). Proper spatial planning can also support natural *experiences* in urban environments.[31] As a result, public space can influence an identity and experience specific to a city which can act as an indirect influence catalyzing participation and adoption of sustainable behaviours.[32]

A sound public environment, with sufficient access to infrastructure pertaining to sustainable behaviour, can influence participation (Wiberg, 2007, personal communication). As mentioned, Evans *et al.* (2004) stated a physical environment influenced by 'urban sprawl' or poor structural planning and individualization of space can disrupt the sense of identity to a community or place-based ownership. Conversely, an appeasing physical environment can spur an internal aesthetic attraction to a place or a consequent desire to get involved in a specific behaviour related to community or environment (Agyeman and Angus, 2002).

Public space is also, in essence, an equalizing space offering a stage for grassroots democratic discussion or participation (Landry, 2000). A spatial environment that promotes interaction can strengthen a community's social capital, by improving the quality and number of interactions (Sellman, 2001).[33] Since social capital is referred to as the *glue* holding communities together, public space can provide the setting to stimulate such interaction.

---

[30] Jan Gehl also states that the number one attraction in the public environment is 'people watching' (Gehl; 2007, personal communication).

[31] Examples include children exploring rainwater canals shaped like streams in public parks, as opposed to street drains; or cities that incorporate bike paths and picnic arenas to help foster community (Corbett and Corbett, 2000).

[32] People are more likely to shift their behaviour or participation when they perceive a connection between their actions and environmental degradation and believe they have the capability to generate positive change (Tanner, 1999). Kollmuss and Agyeman (2002) also mentioned that people with a stronger locus of control believe they can instigate visible change. Following this, our perception of how much control we possess to influence our environment is largely influenced by our community space and norms (McKenzie-Mohr and Smith, 1999). A spatial arena that facilitates interaction, experience and community relations is a strong catalyst for shifting a *community's locus of control* by strengthening social capital and fostering a community's behaviour.

[33] On a community level, Gandy (1994) states that our understanding of environmental problems is itself a *social construction* that rests in a range of negotiated experiences. From the discipline of environmental sociology, environmental concerns are fluid concepts, culturally-grounded and socially-constructed (ibid). Availability of an appropriate spatial environment provides a platform for exchange and information regarding the evolving sphere of environmental and social knowledge.

2.1.8.1 Available infrastructure and choice alternatives

Accompanying urban planning and community space, the availability of sound infrastructure and appropriate access to it can facilitate behaviour (Wiberg, 2007, personal communication). *Accessibility* by which to opt for public transport, separate and dispose of waste in an environmental manner and/ or purchase more sustainable products or forms of energy, thus depends on the existing system (Selman, 1996). Without public availability of infrastructural alternatives, environmentally-conscious citizens cannot participate in corresponding behaviours. Actions regarding environmental behaviour then are also influenced by what Stern *et al.* (1999) refer to as contextual factors, including infrastructure availability.

2.1.9 Safety, convenience and practicality

Complementary to availability of infrastructure, is *convenient* and *safe access* to such an alternative. Certain behaviours, such as public transportation, require preconditions ensuring safety, especially for young or female passengers. This is required before behaviour will become common practice (McKenzie-Mohr and Smith, 1999).[34]

Convenience is central to influence individuals in engaging in various behaviour alternatives. The availability of a bike path, for example, or nearby access to a recycling facility can greatly increase participation in a related behaviour (Corbett and Corbett, 2000).

Figure 2-2: Easy and safe access to biking paths can facilitate this transport alternative[35]

A common deterrent to incorporating environmental behaviour is *practicality* (Kollmus and Agyeman, 2002). Many citizens, regardless of their level of environmental awareness, opt out of environmental behaviour because they lack sufficient time, money, information or interest to complete corresponding environmental behaviour (ibid).

2.2 Barriers to Participation in Environmental Behaviour

While internal and external factors shape positive or negative participation in environmental behaviour, a variety of common or case-specific barriers persist to justify non-participation.

---

[34] Environments that are 'people-friendly' tend to be safer, more respected and maintained, which can facilitate partaking in environmental behaviours (McKenzie-Mohr and Smith, 1999).

[35] This and all other photographic imagery in the thesis document has been taken by thesis author, spring 2007.

Understanding these strictly negative factors, *or barriers*, is critical before implementing any programme attempting to engage citizens and overcome justification for non-participation.

2.2.1 Lack of awareness, lacking alternatives and laziness

In the table below, McKenzie-Mohr and Smith (1999) state what they see as the three primary barriers shaping non-engagement in environmental behaviour.

Table 2-1: Primary barriers to adapting environmental behaviour

Lack of awareness	Lack of alternatives	Laziness
People do not know about an alternative activity or behavioural option, or its benefits.	People who know about the activity may perceive that alternative behaviour entails are significant difficulties or barriers.	People benefit most from continuing to engage in present behaviour because it is the easiest thing to do. (Practicality argument.)

Source: Adapted from McKenzie-Mohr and Smith, 1999

Tanner (1999) following similar rationality, stated that in order to shift behaviour, it must be enacted from *memory*. Thus, whether or not a particular alternative (i.e. how and from where to take a bus) would have occurred to an individual before engaging in a specific activity (i.e. driving) is a barrier. Tanner states that there is often a choice between only a *few* alternatives and it may be difficult for individuals to recognize what is the best option.

Ipsative behaviour, or 'of the self' can act as a barrier or benefit when it comes to environmental behaviour. The ipsative theory of behaviour states that an individual's behaviour is hindered by a lack of real or imaginary opportunities imposed by the individual's internal or external conditions (Tanner, 1999). Thus, when comparing two or more choices, respondents generally pick the option which is most preferred and offers least personal burdens (ibid).

2.2.2 Temporal or place discrepancy

Temporal or place discrepancy stresses how attitudes shift over time or place. For example, soon after the Chernobyl accident, most Swiss residents were avidly against the use of nuclear energy. A few years later however, a memorandum to put a 10 year halt on building new reactors in Switzerland passed by only a very small margin (Kollmuss and Agyeman, 2002). This demonstrates that people's environmental attitudes, perceptions and resulting behaviour regarding the environment change over time. A different study undertaken throughout Europe found a high level of support for renewable energy amongst the general public. However, support at the local level where plans are implemented is significantly reduced; due to a high level of NIMBY (not in my backyard) sediments, particularly regarding erecting new infrastructure (Loring, 2007).

2.2.3 Attitude-behaviour measurement

Attitude-behaviour measurement demonstrates that often the measured attitudes of surveyed respondents are much broader in scope than the behaviour they attempt to measure. Consequently respondents may perceive themselves as environmental or *already* maintaining a sustainable lifestyle (Kollmuss and Agyeman, 2002). For example, questions such as '*Do you*

care about the environment?' or *'Do you recycle?'* are broad in notion and thus may not offer measurable results that can grant effective data to analyze actual levels of environmental behaviour in a community.[36]

2.2.4 Constraining factors

Behaviour is embedded in cultural and individual structures entailing a host of barriers and constraints keeping attitudes from being expressed in behaviour (Tanner, 1999). Constraints include natural and socio-cultural surroundings such as *limitations* in time, income, price, legal and political institutions, current state of scientific knowledge, available technology, infrastructural limitations, availability of various resources, etc (ibid).[37] *Individuality,* lying within a person justifies that even a strong environmental concern can be overcome by a stronger desire or necessity to continue a current non-behaviour (Kollmus and Agyeman, 2002). Consequently, numerous barriers to enacting sustainable behaviour exist and must be overcome, before an individual will participate in sustainable behaviour.

2.3 Strategies to increase participation in sustainable behaviour

If environmental programmes are to be effective in shifting behaviour, they must deliver programmes that remove *perceived* barriers and enhance societal benefits for large segments of the population, building upon influencing factors. Barriers in environmental behaviour are case and programme specific and should be examined within a specific context or community. McKenzie-Mohr and Smith (1999) recommend the following questions:

1. *What behaviour*(s) should be promoted and how?

2. *Who* should the programme address, and *who* in a target group is most likely to change?

3. *What conditions* will an individual face to adopt a specific targeted behaviour?

Many strategies exist and vary in their effectiveness depending on the corresponding situation. Combining various tactics can increase visibility and potential adoption of sustainable behaviour amongst the target audience. The techniques discussed below, extend beyond merely *providing information* in order to improve the likelihood to enhance citizen participation in sustainable behaviour.

2.3.1 Recognizing and minimizing barriers

Before a new environmental programme can shift behaviour, it must first recognize common but also additional case-specific barriers. Behaviour competes with behaviour and thus people need to make decisions amongst competing behaviours (McKenzie-Mohr and Smith, 1999). Table 2-2 below describes how various contending behaviours compete with a new programme to target behaviour. Both the targeted behaviour and the competing behaviours

---

[36] For this reason, the questionnaire and survey given to students during the implementation activity asked them to list various environmental impacts and their specific behaviours accordingly. This is further discussed in Chapter 4 and 5.

[37] The inherent nature of scientific uncertainty, particularly related to global environmental concerns (i.e. global warming), can breed mistrust in scientific or government policy or *confusion* regarding the 'mixed messages' coming from science or environmentalism (Harrison *et al.*, 1996; Tanner, 1999; Alberts, 2006).

have benefits and barriers to participation (ibid). Generally, competing behaviours are *perceived* to have more benefits than targeted behaviour.

Table 2-2: Minimizing barriers to sustainable behaviour

	Target Behaviour	Competing Behaviour 1	Competing Behaviour (2)
Perceived Benefits			
Perceived Barriers			

Source: Adapted from McKenzie-Mohr and Smith, 1999

To promote a targeted behaviour, it is central to shift the ratio from barriers to benefits. McKenzie-Mohr and Smith (1999) suggest four non-mutually exclusive ways to do this.

- *Increase* the *benefits* to the *target* behaviour.

- *Decrease* the *barriers* to the *target* behaviour.

- *Decrease* the *benefits* of the *competing* behaviour(s).

- *Increase* the *barriers* of the *competing* behaviour(s).

2.3.2 Incentives

Economic or other incentives are a popular way by which to shift behaviour.[38] Incentives can shift behaviour by *rewarding* positive behaviour and making it as *visible as possible* to increase public awareness, interest and curiosity in participation (McKenzie-Mohr and Smith, 1999). Non-monetary incentives are primarily shaped by an increase in convenience. For example, in transportation, it is important to alter the balance of incentives and disincentives to *perceived* barriers. In many locations, automobile are associated to few personal disincentives. On the contrary, public transport offers fewer incentives, but many *perceived* disincentives.[39] As further demonstrated in Table 2-3 *perceived* advantages tend to favour automobiles. Barriers and benefits require shifting to order to improve participation in public transport systems. Traffic calming measures can help shift the balance between incentives and disincentives related to transportation (McKenzie-Mohr and Smith, 1999).[40]

---

[38] Amongst effective strategies to shift behaviour, Stern *et al.* (1999) included the role of beneficiary technology, financial or other incentives, appealing to basic values or adapting institutional structures to promote non-monetary incentive.

[39] Of course this depends on the public transport system provided and its level of *convenience.*

[40] Examples include: carpool/ bus lanes, shifting roads from two-ways to one-ways, reducing the speed limit to make driving more time consuming and pedestrian/ bike travel more safe, physically altering street design, reducing available parking or charging congestion charges to enter urban spaces (McKenzie-Mohr and Smith, 1999). Companies who match employees based upon the neighborhoods where they live can substantially increase carpooling, particularly if they include additional incentives including access to prime parking (ibid).

Table 2-3: Comparing perceived barriers and benefits to public transport[41]

	Public Transport	**Automobiles**
Perceived Benefits	making friends, having time to study, read or relax, or not having to search for parking	shorter travel time, prestige, arrival/departure flexibility, privacy, route selection, cargo capacity, predictability, delayed costs and enjoyment of driving
Perceived Barriers or disincentives	weather exposure, discomfort, noise, dirt, surly personnel, long walks, crime, immediate costs, unpredictability, small or no cargo capacity, limited route selection, crowds, restricted time flexibility, low prestige and long travel time	limited *perceived* personal disincentives: finding parking, maintenance, traffic

Source: McKenzie-Mohr and Smith, 1999

Monetary incentives, such as weight-based payment for waste collection, offer an effective solution to help shift consumption and with time, behaviour. For example, in 1980 Seattle introduced a pay-as-you-throw (PAYT) technique to curb waste-related behaviour.[42] By 1992, this financial-incentive was so effective that overall amount of resident waste reduced from 3.5 cans of garbage per household per week to only one. This was complimented by an information campaign to promote the benefits of recycling, which consequently helped reduce the *perception* of accumulating trash (McKenzie-Mohr and Smith, 1999).

Incentives also act as effective measures to curb energy consumption and promote energy efficiency. Charging higher electricity rates during peak-hour consumption can help shift overall electricity patterns, as to reduce peak electricity during the day (McKenzie-Mohr and Smith, 1999; Pallak *et al.*, 1980). Additionally, homeowners who receive subsidized loans for retrofitting are more likely to participate, particularly if communication is improved.

2.3.2.1 Unintended consequences

While benefits of incentives are evident, it is also important to recognize the possibility of adverse effects related to incentives. Once incentives are in place, it can be difficult to remove them.[43] Doing so can create public mistrust or return old behaviour. Even when incentives are implemented, people can find creative ways to abuse incentives, such as using a mannequin in a carpool lane to be able to travel faster (McKenzie-Mohr and Smith, 1999).

Surprisingly, some researchers found that economic incentives can have *unintended* policy consequence. Financial incentives can potentially reduce an individual's perceived sense of responsibility (Nyborg, 2003). Regarding waste management, Thogersen (1996) made the following cautionary remark:

> "In affluent industrialized nations, a clean environment is a
> highly valued goal, and most people feel an obligation to

---

[41] This particular example examined perceived barriers and benefits pertaining to transport choices in North America. Factors influencing behaviour may vary if applying a comparison in a different local (McKenzie-Mohr and Smith, 1999).

[42] Seattle is located in Washington State in USA.

[43] This can depend however on the type of incentive. There are many time-limited incentive schemes.

behave in an environmentally friendly manner. Hence, if they are provided with proper information and opportunities, most people are willing to carry some costs if it benefits the environment. If, on the other hand, an economic incentive is offered to compensate for the private costs from behaving in an environmentally friendly fashion, the framing of the behaviour in the mind of the actor may change in a way that weakens or destroys the moral obligation."

If the incentive is small, which is frequently a prerequisite for economic efficiency; there is a risk that it will cause a reframing effect to *overpower* the stimulating impact of the conventional norm on the behaviour (Thogersen, 1996). Case in point, students in Lund justified littering aluminium cans and bottles stating that *someone else*, perceived to be financially-burdened, will later pick-up the cans and bottles. The financial incentive not only justified littering in the students' minds, it further validated not returning to pick up the cans at a later time because *someone else* was presumed to do so (Student interview, 2007, personal communication).[44] Understanding the interplay between policy, norms and individual behaviour, including the interplay between different types of norms influenced by incentives is vital (Nyborg, 2003).

2.3.3 Community-Based Social Marketing

Whilst conventional marketing relies heavily on media-advertising to generate public awareness, *Community-Based Social Marketing* (CBSM) focuses both on building awareness *and* on shifting behaviour (McKenzie-Mohr and Smith, 1999). It draws on social psychology which suggests that initiatives to promote behaviour change are most effective when carried out at the *community* level through *direct* contact with the targeted audience (ibid). Traditionally, environmental information campaigns primarily utilized conventional marketing techniques to attempt to stimulate behaviour change. In this more traditional approach, the targeted behaviour is viewed as a product to be sold. Advertising *is* effective in altering consumer preferences between different brands, as its conventional purpose demonstrates. However, altering consumer preferences to promote sustainable behaviour does not involve choosing between two like products. Instead, CBSM works to *alter an existing behaviour* towards a more sustainable alternative. Thus, the cornerstone of sustainability is delivering programs that *change behaviour*. McKenzie-Mohr and Smith (1999) stated, "*The failure of mass media campaigns to foster sustainable behaviour is due in part to the poor design of the message, but more importantly to an underestimation of the difficulty of changing behaviour.*"[45]

CBSM works with community representatives to attempt to understand local community needs and the feasibility of a particular behaviour-change programme (McKenzie-Mohr and Smith, 1999). Pilot groups, in the target community or audience, help define specific community values and needs to cater behaviour-related programmes of relevance to the target-audience. Next pilot studies in small portions of the community test pending results. Preliminary results and evaluated and, if strategies are effective in changing behaviour, similar techniques are extended to the wider community.

---

[44] This student comment *may or may not* represent the broader community; however similar findings are reported by Nyborg (2003) stating that financial incentives can remove societal norms and remove the *imbedded sense of obligation*.

[45] McKenzie-Mohr and Smith (1999) do acknowledge that media visibility (as discussed in Section 2.2.1) can *indirectly* support behaviour. However, beyond creating awareness, CBSM offers support to build on such awareness generation.

CBSM starts with *barriers* that require changing, as discussed with community representatives.[46] Next CBSM works with behaviour change tools to form programmes that are most effective. These strategies build upon each other, reinforcing and supporting adoption of behaviour. Most commonly-used behaviour change tools are illustrated below, in Figure 2-2, and described in the following sections.
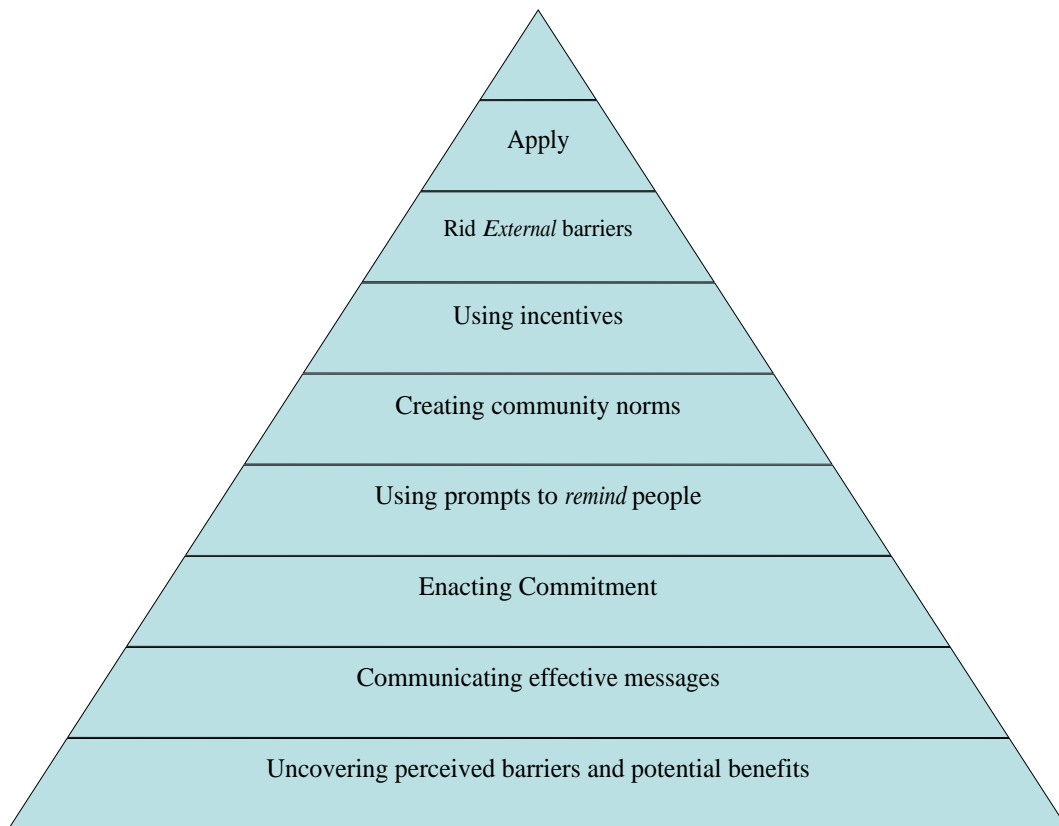
Figure 2-3: CBSM build upon each other, using previous strategies as foundations for stages to follow.

Source: Adapted from McKenzie Mohr and Smith, 1999

2.3.3.1 Communicate

Communication techniques are the *turning point* by which to reach attention and the interest of a wider public spectrum. Thus, creating effective message is fundamental. Successful communication includes a variety of schemes, as illustrated in Figure 2-4 and described thereafter. Communication can be implemented in the sequential order listed or catered to the specific context. As research demonstrates the techniques mentioned can improve adoption of behaviour change (Windahl *et al.*, 1997; McKenzie-Mohr and Smith, 1999).

---

[46] CBSM recognizes many barriers are difficult to define, or may be activity or location-specific (McKenzie-Mohr and Smith, 1999).
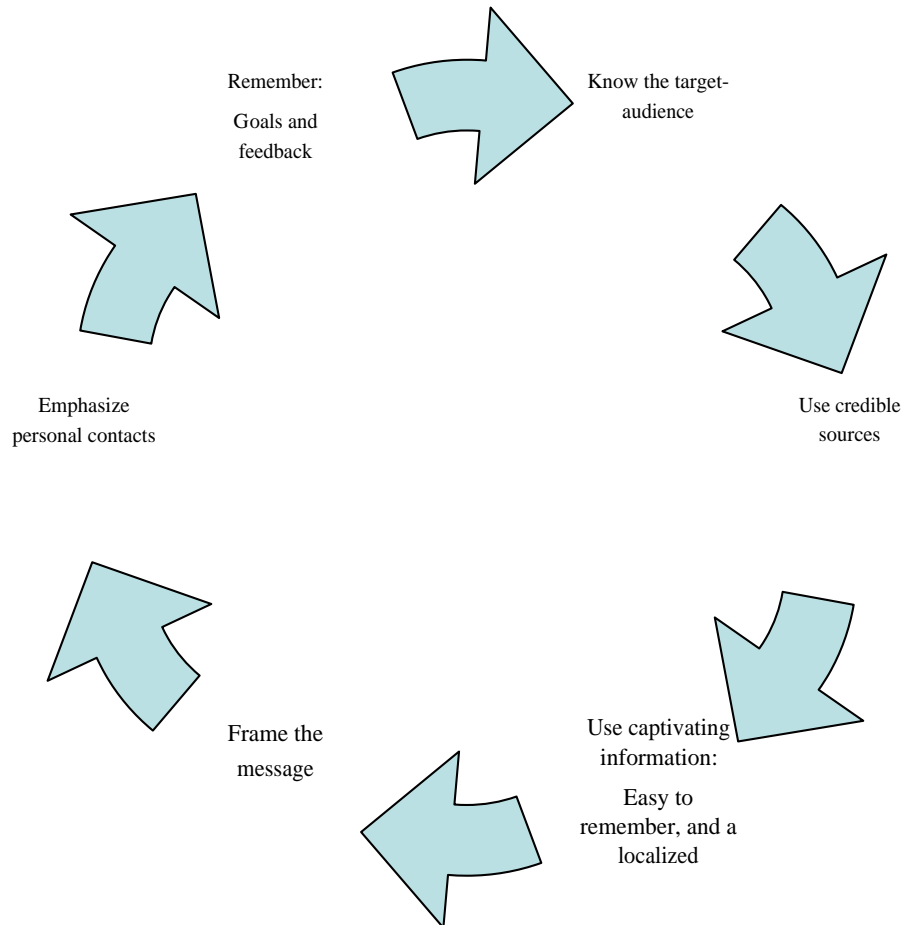
Figure 2-4: Strategies and tools by which to communicate behaviour change

Source: Adapted from McKenzie-Mohr and Smith, 1999

Know the target-audience and its perception

Communication strategies should focus on particular attitudes, beliefs and behaviour patterns of an intended audience, as well as living environments (Windahl *et al.*, 1997; Sellman, 2001).[47] By and large, most people perceive themselves as *already* living a sustainable lifestyle (McKenzie-Mohr and Smith, 1999; Agyeman and Angus, 2002). Accordingly they maintain a positive perception of their current behaviour to maintain a sustainable lifestyle. While some campaigns (i.e. *Greenpeace* or 'dooms-day' documentaries) may challenge such a perception, CBSM states that generally, positive depictions of society should be maintained and used to improve sustainable behaviour *incrementally* (ibid). Following this, it is important *not* to present a message too far removed from the generally beliefs of the intended audience. If a message is too *extreme*, it may actually prove to be less, rather than more, supported by those who it was targeted to reach (ibid). *Extreme* or overly-critical messages can cause the target audience to turn away because of scepticism or irritation. McKenzie-Mohr and Smith (1999) state that environmental communication is most effective when implemented gradually, through *baby steps*. Such a measure will build sustainable behaviour with long-term reception (ibid).

---

[47] For example, consumption of hazardous materials including house-paint or car chemicals differs in private free-standing homes with car access, than in a small city apartment in which most residents walk or bike (McKenzie-Mohr and Smith, 1999). To remove hazardous chemicals from the common waste stream strategies should cater to the residents' situation.

Capture Attention

In order to persuade citizens to shift behaviour, a successful campaign must first gain attention.[48]   It is best to concentrate a communication campaign around a single desired behaviour. Promoting one behavioural preference demonstrates consistency for people (McKenzie-Mohr and Smith, 1999).

Communication strategies are most effective when the message is graphic and clearly understood. This can be done through the use of vivid and concrete information (Windahl *et al.*, 1997). Personal or localized messages for the target-audience can help further influence behavioural change (Windahl *et al.*, 1997).   For example, to grab customer attention, energy auditors were taught to use vivid explanations about heat drafts and related energy loss (McKenzie-Mohr and Smith, 1999).   During home inspections, auditors articulated that cracks add up a collective gap the *size of a football*. Or an attic with poor insulation is like a *'naked attic without an overcoat'* (ibid). Communication campaigns utilizing vivid information increase the likelihood that a message will be attained two-fold: first, through initial intake and further, via *encoding* it can be recalled later (Hannigan, 1995; Harrison *et al.,* 1996; McKenzie-Mohr and Smith, 1999).   With all the information accumulated in a day, a communication strategy should utilize a tactic that *stands out* amongst the barrage of other information received.[49]

Despite earnest attempts otherwise, the public has a very poor understanding of individual or household resource consumption (McKenzie-Mohr and Smith, 1999). Generally, households largely underestimate less visible resources and have a bias towards more visible sources of energy (Milfont and Duckitt, 2004).   Professor Anna-Lisa Lindén refers to this as the *invisibility of* energy (2007, personal communication).   Research has found that citizens are more likely to concentrate on saving energy consumption in lighting than via hot water reduction (Milfont and Duckitt, 2004).   To be effective in reducing energy, communication campaigns should help residents *see* what is less visible in terms of energy consumption (McKenzie-Mohr and Smith, 1999).   To help residents 'see' how much water, energy or waste is produced or consumed; one strategy is to compare it to local landmarks.   Case in point: *As much water or waste to fill the city swimming pool five times or the local football field* (ibid).[50]

Frame the message

How the message is presented is a critical determinant as to whether it will be effective in reaching the behaviour intended (Windahl *et al.*, 1997).   Sustainable behaviour can be presented positively, such as promoting that compost can reduce garbage fees, or with a negative undertone. Research has found that messages emphasizing economic or time loss can be persuasive (McKenzie-Mohr and Smith, 1999).   Messages with a threatening undertone can be effective in *grabbing attention* regarding an 'impending doom' that a

---

[48] Some techniques to capture attention include *modeling*, in videos or demonstrations. These demonstrate and explain potential environmental, social or cost savings. Modeling helps citizens understand how to engage in a particular behaviour and can help them recognize that potential barriers are often quite low (McKenzie-Mohr and Smith, 1999).

[49] Printed materials with vivid information, such as bright and colourful door hangers, are more likely to be remembered and potentially incorporated, as opposed to bill inserts (McKenzie-Mohr and Smith, 1999).

[50] *Life Magazine* used visual interpretation to display consumptive habits in Western society. They featured an 'average' North American family, along with all of their home possessions and consequent energy consumption in front of their house.   This visual imagery effectively helped citizens *see* how tangible possessions accumulate and how much consequent energy and resources are consumed or displaced due to our lifestyle (McKenzie-Mohr and Smith, 1999).

behaviour shift could avoid (McKenzie-Mohr and Smith, 1999). Such messages do capture attention. However, threatening messages need to be combined with clear suggestions regarding *how* and *what* people can do to reduce the supposed threat (ibid). This connects theoretical and practical communication.

In some circumstances, when faced with difficult information about the environment, citizens may face either problem- or emotional-focused coping (McKenzie-Mohr and Smith, 1999; Kollmuss and Agyeman, 2002). *Problem-focused coping* generally seeks for direct actions to alleviate the threat. Such an outlook can effectively shift behaviour to a more environmental means. *Emotional-focused coping*, however, functions quite the opposite. Emotional-focused coping tends to result in residents ignoring the issue, changing the topic or denying that a problem even exists. The way society or individuals cope depends on how much control they perceive they possess (McKenzie-Mohr and Smith, 1999).[51] To promote an environmental campaign, it is important to engender a feeling of common purpose and efficacy (ibid). Threatening messages should be combined with empowering messages that do not only emphasize losses that can occur from inaction but also messages that *emphasize savings* and a *positive shift* of circumstance if action is taken (ibid).[52]

Communication should focus on messages that are specific to a particular targeted behaviour. Further, such messages should be easy to remember. Recycling campaigns that focus on collecting all recyclable items together, have a higher rate of participation and higher capture, than schemes that emphasize extensive sorting (McKenzie-Mohr and Smith, 1999). Combined recycling is broad and understandable (ibid). It is not only easier to remember but more *convenient,* which influences sustainable behaviour.

Local leaders and personal contacts

Using a popular or trusted member of local society to promote a targeted behaviour can increase the likelihood of curiosity and community influence. Such an individual can present the same information, but acts as a different sphere of influence to endorse or reinforce a message (Burn, 1991). Recognized community leaders promote positive advertising of environmental behaviour by switching the public attitude and *indirectly* influencing the topics of discussion pertaining to the environment (McKenzie-Mohr and Smith, 1999).

Beyond famed personalities, research (as described in section 2.2.4) demonstrates that a primary influence on attitudes and behaviour is not media, but *contact with others* (McKenzie-Mohr and Smith, 1999). Emphasizing personal contacts is an effective way to promote sustainable behaviour. Social diffusion occurs through transmission of information through friends or family and is generally greatly under-utilized (ibid). This technique is fostered by encouraging citizens to spread information to friends and family (ibid).[53]

---

[51] This can be linked to the relative perception or sense of community (McKenzie-Mohr and Smith 1999; Selman, 2001). If we sense little common purpose in a community setting, this can lead to a perception that there is little we can do personally or as a community

[52] Such a communication strategy can make sustainable living and behaviour choices *attractive* to participate in.

[53] Utilizing neighborhood block leaders can provide many opportunities. It is local in scope and builds *personal relations.* Community block leaders are a strong contribution to grassroots democracy. They are effective in several ways: via a commitment to the community, by *modeling norms* for others to observe, and act as a powerful and cost-effective means to communicate (McKenzie-Mohr and Smith, 1999

Goals and feedback

In framing the message it is important to decide whether to promote personal or community goals for involvement. One strategy is to provide targets for each household (McKenzie-Mohr and Smith, 1999). This can be effective if households are *interested* and *willing* to work to reduce consumption or waste, for example.

Finally, every effective message of environmental communication should be equipped with some notion of feedback to help persuade people to adopt a new activity. Newsletters or signs make it easier to remember. Such messages can act as encouragement to citizens to help change individual environmental actions into long-term behavioural changes (McKenzie-Mohr and Smith, 1999).

2.3.3.2 Commitment

Upon knowing the barriers to sustainable behaviour and how to communicate with the target audience, developing a sense of commitment can initiate the target audience from *intention* to *action* and behaviour change. To foster commitment, one suggestion is to *start small* and get citizens to first agree to minor requests (McKenzie-Mohr and Smith, 1999). By agreeing to a small request *first*, such as signing a petition, there is an better likelihood of the same citizen agreeing to a larger request *soon after,* such as financially contributing to a project of the same nature as the petition (Schwarzwald *et al.*, 1979).

People have an internal desire to appear consistent in front of their neighbourhood, community or even themselves. Commitment then, is a personality-trait which can foster behaviour change (Cialdini, 1993; Bell *et al.*, 1996). When people agree to a small request, it can alter the way they perceive themselves concerning a particular issue. They may come to view themselves as the type of person who may support a particular initiative or have a generally altruistic attitude (ibid). This can effectively shift the way people perceive themselves in an enduring way regarding similar issues and foster social or environmental behaviour change. Even small amounts of participation can effectively shift our internal perception and help us perceive ourselves as the type of person who is *giving* and *generous* (Cialdini, 1993; McKenzie-Mohr and Smith, 1999).[54]

Pertaining to verbal commitment, a study was conducted to increase bus ridership in a community; see Table 2-4. Different strategies were measured *simultaneously* using verbal communication to examine the role *commitment* played in various behavioural patterns (McKenzie-Mohr and Smith, 1999).

---

[54] Pacific Gas and Electric Home Assessors of North America were trained in similar CBSM techniques to ask the following questions during home energy audits (Pallak *et al*., 1980).

"When do you think you'll have the weather-stripping finished? …I'll give you a call to see how it is coming or if you're having problems."

Subtle changes in *how a situation is presented* can result in a substantial increase in the likelihood that households would retrofit homes (McKenzie-Mohr and Smith, 1999). In fact, home energy auditors trained in behavioural change tools to include such questions aiming to *instigate commitment* were able to convince three to four times more households to weatherize their dwellings (Pallak *et al*., 1980).

Table 2-4: Various strategies to promote public transportation[55]

1st scenario	2nd scenario	3rd scenario	4th scenario
Employees were *only* given information regarding bus routes and time schedules.	Employees were asked to *verbally pledge* they would take the bus two times per week.	Employees were *given 10 free bus tickets* and promised they would receive more when needed.	Employees were asked to *make a commitment* and received *complementary bus tickets*.

Source: Data from McKenzie-Mohr and Smith, 1999

Surprisingly, the second scenario, based only on commitment had the same results as the third and fourth scenario in which employees also received the incentive of the bus ticket.

Even more effective than verbal commitments, is asking residents to make a signed commitment or make *commitment* publicly acknowledged. When information regarding behaviour of residents, companies or neighbourhoods is publicized to the community at large, it can influence behaviour (Pallak *et al.*, 1980). The more public a commitment *is* the better the likelihood of it being honoured. This occurs because people have an internal desire to appear *consistent* in behaviour (Cialdini, 1993; Bell *et al.*, 1996; McKenzie-Mohr and Smith, 1999). Group commitments can also be effective in situations with strong group cohesion (Wang and Katzev, 1990; Siero *et al.*, 1996).

Another strategy is to *actively involve* the targeted populations in activities can build commitment.[56] It is also recommended to build commitment amongst behaviour that the community is sincerely interested in engaging in (McKenzie-Mohr and Smith, 1999). This further justifies involving people in focus groups or active public participation in preliminary stages of programmes related to behavioural change.

Finally, behaviour change is most effective when reinforced through positive commentary. By expressing encouragement such as, *"You are a generous person. I wish more people were as charitable as you"* can encourage a higher level of commitment than simply by expressing *"Thank you"* (McKenzie-Mohr and Smith, 1999). The effectiveness of positive commentary can be further enhanced by requesting community members to encourage others to get involved in similar behaviour. This can generate a larger influence of a particular behaviour-change programme.

2.3.3.3 Prompts

Upon building commitment amongst residents, it is important to recognize another major deterrent to sustainable behaviour: *forgetting* (McKenzie-Mohr and Smith, 1999).[57] While one may have intentions or attitude may attempt to build sustainable behaviour, it can be difficult to *remember* to practice *such behaviour*.

Prompts provide an effective reminder to citizens to engage in sustainable behaviour. They can be visual or auditory, but should be relevant and closely-related to the targeted behaviour as to catch *attention* and keeps the attention until participation in the particular behaviour is

---

[55] This was tested in a specific context and may not be applicable in all cases. However, similar studies have applied comparable strategies and have been effective (McKenzie-Mohr and Smith, 1999).

[56] This includes engaging home-owners in home energy audits along with auditors (Pallak *et al.*, 1980).

[57] Forgetting to turn off the lights or turn down the heat are examples that can hinder our behaviour (Tanner, 1999).

achieved. Examples include locating park litter receptacles or office recycling bins more visibly. This will also help increase the level of convenience, which can help support environmental behaviour (O'Neill *et al.*, 1980). Prompts can be effective in encouraging repetitive behaviour, such as closing blinds to keep the heat out during the summer or the cold out in the winter. Finally, prompts are also effective when attempting to influence behaviour at the point of sale (McKenzie-Mohr and Smith, 1999); see Figure 2-5.

Figure 2-5: Various prompts to 'remind' people of behaviour, either at point of sale or making a behaviour alternative more obvious

2.3.3.4 Norms

As discussed in section 2.1.3, norms can be a powerful influence on behaviour. Building appropriate community norms to encourage sustainability can increase participation in behaviour-related programmes. However, generally little attention has been given to the role of norm adoption to promote sustainable behaviour (McKenzie-Mohr and Smith, 1999). Environmental regulations often attempt to dictate related public or company behaviour. Norm experimentation, on the other hand, has demonstrated that incorporating a portion of society as an 'example' for others to follow can be more effective (ibid).[58]

Robert Cialdini, a researcher in environmental behaviour, conducted an experiment to examine the role of norms in influencing litter pick up. Small flyers were placed under window wipers of several hundred cars in a library parking lot. In the first experiment, over one-third of the population tossed these small papers on the ground (Cialdini *et al.*, 1990). In the second experiment, an accomplice to Mr. Cialdini walked past and made a point to *pick up* litter in front of patrons leaving the library. Simply viewing such behaviour altered the overall citizen norm pertaining to litter and reduced consequent littering significantly. Virtually no one threw the flyers to the ground (ibid). A third experiment was conducted in which researchers distributed numerous flyers on the ground. This created an *already* littered environment. With an already high level of litter present, citizens were more apt to *contribute* to the litter. Most individuals tossed the small papers on the ground (ibid).

In norm theory there are two main factors that influence citizen behaviour: *compliance* and *conformity* (McKenzie-Mohr and Smith, 1999). *Compliance,* in the discourse of norm theory,

---

[58] In the 1930s, American farmers lost significant topsoil from fields. The U.S. government tried to distribute *information* which detailed problems and suggestions (including planting trees as wind screens). Such information was ineffective. Afterwards, campaigns worked directly with a small number of farmers to assist them in tree-planting. Modeling these techniques was more compelling and encouraged other farmers to discuss the new technique. After its successful implementation, many additional farmers adopted a similar procedure (McKenzie-Mohr and Smith, 1999).

refers to the fact that individuals alter their behaviour to receive a reward, to provoke a favourable reaction from others, or to avoid punishment.

On the contrary, *conformity* occurs when individuals observe the behaviour of others to determine how they should behave. This has a much longer-lasting impact on overall behaviour (Cialdini, 1993; McKenzie-Mohr and Smith, 1999). To positively influence conformity, one effective measure is to demonstrate or communicate to the public that the vast majority of people living in the community-of-focus strongly believe that it is important to participate in sustainable behaviour. Communicating this message to the public can actually increase corresponding behaviour (McKenzie-Mohr and Smith, 1999).[59] Stressing high participation and the *perceived* societal importance of this participation can stimulate an increased level of overall participation (McKenzie-Mohr and Smith, 1999; Kollmuss and Agyeman, 2002).[60] Other tactics pertaining to norms include making a norm visible. Residents often recycle because it is the 'right thing to do' and because most fellow residents' also *visibly* participate in such behaviour (O'Neill *et al.*, 1980).

Direct contact with people in a community, rather than through campaigns that rely upon information alone, can further the influence of norms within a community (McKenzie-Mohr and Smith, 1999). One example is to involve a volunteer block-leader in an energy-management or recycling programme. This induces commitment amongst residents and helps visibly acknowledge the behavioural norm within their community (Burn, 1991).

2.3.3.5 Incentives

Incentives are an important strategy associated to CBSM. Incentives, discussed previously in Section 2.3.2, provide a 'solution' in and of themselves and are widely incorporated because of their ability to build public participation and facilitate behavioural change.

2.3.3.6 Removing External Barriers

CBSM strategies are effective in promoting sustainable behaviour in the mindset of a community as long as it is not, amongst other aspects, too *inconvenient, unpleasant, costly* or *overly time-consuming*. Such barriers can be significant obstacles to any programme attempting to promote sustainable behaviour. While external barriers are often only *perceived* barriers, and do not exist in reality; getting the public to realize this requires creativity and patience.[61]

In order to effectively implement sustainable behaviour in a community, it is important to design a programme that enhances motivation by making the targeted behaviour convenient and less costly. Increasing convenience will help some participants realize many barriers are *simply a matter of perception*. When citizens participate in a particular behaviour or activity, they realize that potential barriers are actually minimal (McKenzie-Mohr and Smith, 1999). Removing barriers from a targeted behaviour should be tailored to a specific situation, as well as a targeted population. It is thus crucial to ask residents *how* and *why* they perform a

---

[59] This builds on the idea of the *perceived level of commitment* in a community and the desire to appear *consistent* (Cialdini, 1993).

[60] However, such communication techniques can also be misled, or used to promote propaganda. Thus, there exists a fine line as to how to employ this technique depending on what the issue/message is and why it is being communicated.

[61] There are many *perceived* inconveniences associated to composting, including odor, potential pests, land-uptake and time. Implementing curbside collection of compost and providing containers allows such behaviour to become convenient or inexpensive. This can increases the rate of participation in such behaviour (McKenzie-Mohr and Smith, 1999).

specific choice alternative and how would it be most effective to shift such behaviour to a more sustainable alternative (ibid).

Design and evaluation in order to build effective programmes

Public consultation and focus groups can help define case-specific barriers (McKenzie-Mohr and Smith, 1999). Utilizing random assignment ensures the largest portion of the community is involved. Depending on the barriers of a particular behaviour, different strategies will be effective. Once a plan is established, it is best to pilot a particular strategy to evaluate its value in a larger community (ibid). After the programme is piloted, the potential effect on behavioural change should be evaluated. And if necessary revised and piloted again.

2.3.4 Comparative Feedback

Pertaining to organizations, schools, institutions or companies, exploiting organizational behaviour can motivate behavioural change. *If* group cohesion is strong and personal identification exists within a group; it can encourage positive psychological and behavioural consequences (Siero *et al.,* 1996). Instilling comparative feedback between two like organizations can stimulate camaraderie within an organization and competition amongst like organizations (Wang and Katzev, 1990).[62]

Comparative feedback promotes competitive feelings, increases attention to incoming feedback and stimulates a desire to strive to perform better than the other group (Siero *et al.,* 1996). Comparative feedback includes commitment and incentives. Such a technique focuses on collective rather than individual interests and works most effectively when included with goal-setting and consistent feedback. Management or leadership that attempts to motivate employees/ members of an organization can help to retain behavioural change *after* the competition is completed (ibid). In the process of such competition, comparative feedback *expands knowledge* and provides *motivation* to foster change and boost common identity, moral and cooperative behaviour (ibid). Employees who feel competent to achieve the performance goal also maintain a stronger sense of internal control. This can transfer motivation to other behaviours and further increases sustainability (ibid).

As the thesis research attempts to demonstrate, technological advancements to reduce energy consumption are only worthwhile *if* less energy is wasted in resulting behaviour. Comparative feedback is among the measures that seek to combine technological improvements with consequent behaviour changes (Siero *et al.,* 1996). Competition, however, is only effective if strong group camaraderie and the *ability to change* already exist. If results demonstrate an *increase* in energy consumption or behaviour that increases resource consumption, comparative feedback can de-motivate behaviour (ibid). Accordingly, *how* and *when* comparative feedback is implemented depends on factors including infrastructure, technology, information and motivation.

A basic condition in implementing comparative feedback is that the behaviour to change has to be accurately specified and measured in a way that group members understand and perceive that feedback is reliable and dependent on their behaviour (Siero *et al.,* 1996). Specifying the measure of change through identifiable means; to which group members can

---

[62] Researchers in the Netherlands found that introducing comparative feedback provided an effective behavioural change tool to motivate employees to shift organizational energy-consumption behaviour and incorporate more sustainable conduct in energy-wasting behaviour (Siero *et al.,* 1996).

relate, will facilitate behaviour change. When implemented with appropriate training, awareness and comprehensible feedback, comparative feedback stimulates a larger impact on changing various non-environmental behaviours, such as energy-wasting behaviour, than traditional behaviour change programmes (ibid).[63]

2.3.5 Empowerment Evaluation

The methodology of empowerment evaluation provides strategies as to how best to reach out to a specific target-group and encourage behaviour change. Empowerment evaluation has a clear-cut value orientation: It is designed to help people (in these cases, students) help themselves and improve their lifestyle using self-evaluation and reflection (Fetterman, 2001). While not specific to environmental behaviour, it provides a framework by which to *evaluate* responses, *encourage* interaction and *stimulate* internal reflection (ibid).

2.4 Summary

In brief two inter-related discourses have been discussed: *factors influencing behaviour* and how to *enhance participation* in sustainable choice alternatives. Sustainable behaviour, adapted in an urban environment, complements technological advancements and policy implementation, and can facilitate a reduction of urban environmental burdens. Before implementing a behaviour-change programme, it is important to understand primary factors which can influence behaviour. These factors may fall outside of a programme which attempt to increase participation in sustainable behaviour, or can be supported and incorporated as measures to catalyze environmental behaviour. Factors mentioned, such as improved access to infrastructure, were considered in the literature because they have the ability to positively or negatively influence behaviour depending on the context or setting. Such factors are reemphasized in Figure 2-6.

---

[63] This was tested in a specific context and may not be applicable in all cases. However, other studies have applied similar strategies and received comparable results (Wang and Katzev, 1990; Siero *et al.,* 1996).
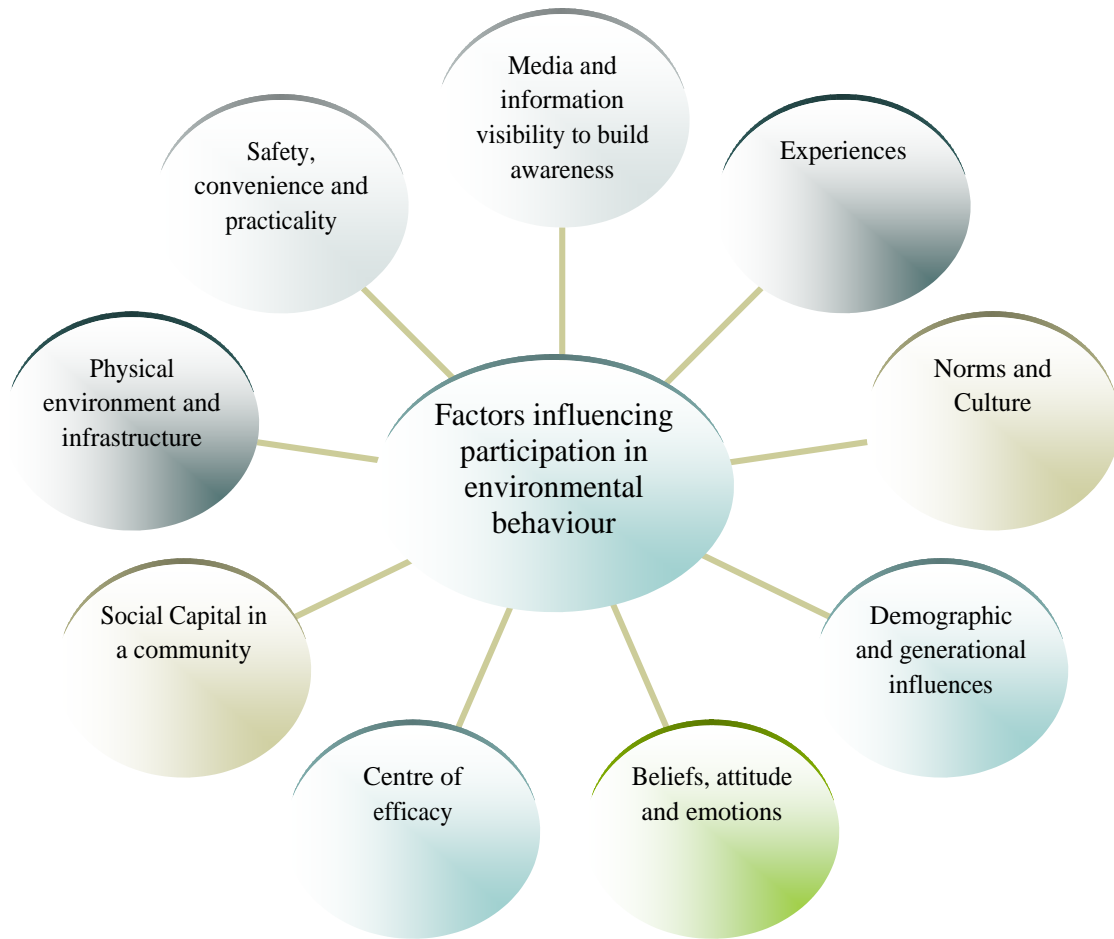
Figure 2-6: Primary factors influencing positive or negative participation in environmental behaviour

As demonstrated by Figure 2-6, influencing sustainable behaviour requires a foundation of environmental and social awareness. However while information is a vital element in generating awareness, it is only one of many interacting factors. Generally, information alone does not shift behaviour. There can also be various barriers that justify non-participation in environmental behaviour. These need to be overcome prior to increasing citizen participation in environmental behaviours.

When barriers are recognized and considered, a variety of suggested techniques exist by which to surmount barriers and motivate a behaviour shift, as were discussed in the literature review in section 2.3. Methods and strategies deemed most influential in the creation of the behavioural change tool are highlighted in Figure 2-7 and further discussed in Chapter 4.
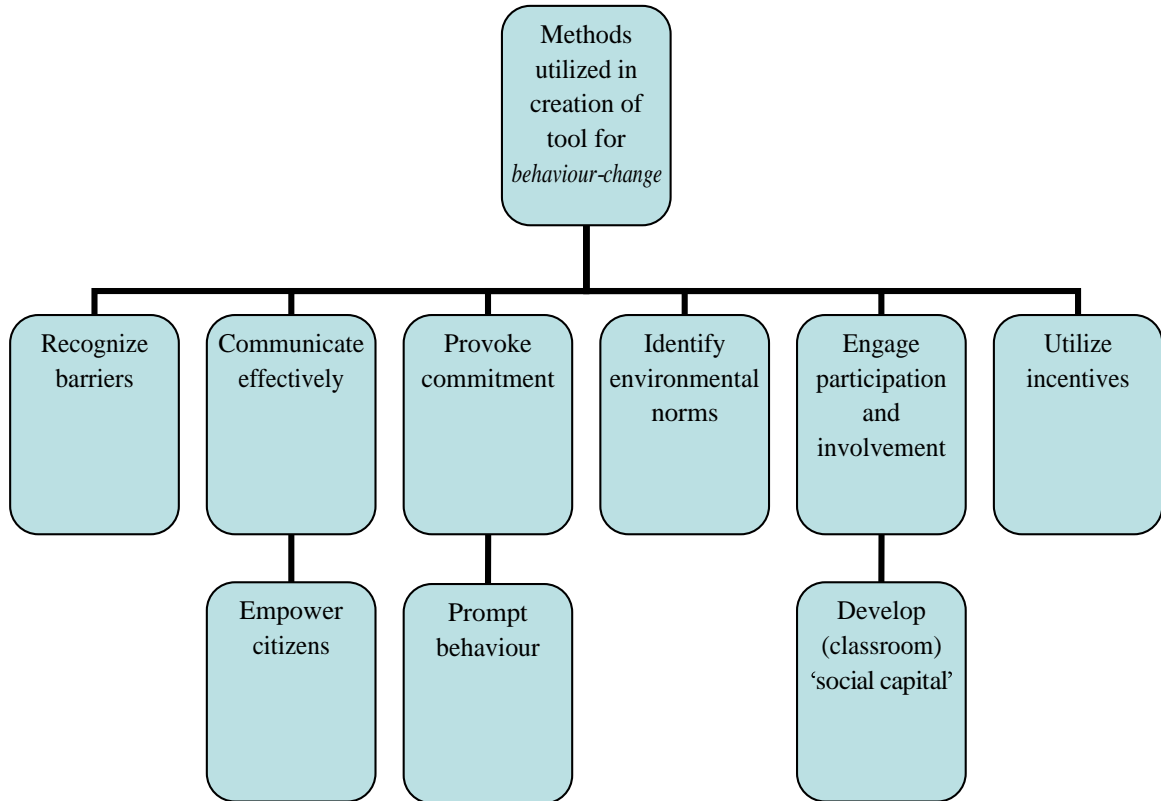
Figure 2-7: Strategies utilized by which to shift behaviour

Amongst strategies discussed, *community-based social marketing* as a collective strategy was quite influential in the designing of the teaching tool, as will be discussed in Chapter 4. CBSM is pragmatic and builds on itself. It starts by uncovering barriers and involves the community in all stages (McKenzie-Mohr and Smith, 1999). CBSM strategies stress *commitment*, involve *prompting*, work with generating environmental *norms* and concentrate on *communication* and *incentives*. When implemented properly, CBSM can effectively reduce the urban environmental burden and increase passive and active participation. This results in improved participation in environmental behaviour within a community and can thus facilitate sustainability in an urban setting.

3 Description of case cities: Choice alternatives and participatory behaviour in Malmö and Lund

As mentioned in Chapter 1, general environmental awareness and available infrastructure is considered to be *already* quite advanced Sweden, and in case study cities of Malmö and Lund (James, 2002). Environmental concerns receive visibility in media including product advertising, TV documentaries and in the daily news.[64] Environmental concerns are discussed in schools and in citizen conversation.[65] Malmö and Lund also have municipal environmental departments working to engage citizens regarding behavioural alternatives as will be demonstrated. The mention of social and environmental programmes and alternatives are moreover observable in the public environment, as noted in Figure 3-1.

Figure 3-1: Environmental alternatives receive extensive visibility in both Malmö and Lund

The three images, from left to right describe various environmental alternatives offered in both *Skåne* cities. The first image is an advertisement for *Naturbussen*; a public alternative providing transportation to outlying areas.[66] The second image promoting recycling is placed in a public location.[67] The third image, *bicycles*, is a common transportation alternative that receives high use and visibility in Malmö and Lund. By means of available infrastructure that encourages sustainability, and through attention to environmental alternatives, citizens in Malmö and Lund have opportunity to incorporate sustainable behaviour in daily lifestyles. Below are some programmes undertaken in Malmö and Lund which attempt to improve urban sustainability via choice alternatives.

3.1 Engaging public participation and encouraging environmental behaviour: Selected examples in Malmö

Until the early 1990s, Malmö was one of Sweden's largest industrial centres, with a noteworthy shipyard as a defining character. It is a highly international city with 605,000

---

[64] Observation of the author based on examination of the urban environment and also via watching environmental broadcasts and advertisements on television radio programming new media in spring 2007.

[65] As discussed during the teacher interviews.

[66] This demonstrates the use of a conventional marketing technique.

[67] Again, convention marketing which describes how packaging *previously considered trash* is used as raw materials.

residents (including outlying areas), of which 23% are born outside Sweden coming from 163 countries (Malmö stad, 2002).

From 1990 to 1994 however, numerous jobs were lost and employment rose nearly 25% (Reepalu, 2006, personal communication). Consequently Malmö needed to take on a new direction. In 1995 several political visionaries, including Malmö's mayor (*Illmar Reepalu*) decided to re-think Malmö's future (ibid). Various stakeholders gathered to discuss Malmö's new role in the coming century and to define the city around ideals of *social welfare*, *education*, *communication*, as well as *environment* and *urban sustainability* (ibid). Through plans which involved various stakeholders and target groups from the public at large, today Malmö has become a dynamic centre for environmental and social initiatives (Malmö stad, 2002). Cities around the world seeking to incorporate urban sustainability or revitalization view Malmö as an example of how to integrate such ideas (James, 2002). Through local, national and EU initiatives Malmö has revitalized parts of the city and instigated new motions for change and participation. Below are listed a few examples which *inform* and *involve* the public in sustainable choice alternatives.

3.1.1 Fair Trade City

In May 2006, Malmö became Sweden's first fairtrade city and has attempted to increase visibility and accessibility of fairtrade goods (Rolfsdotter-Jansson, 2006). Such goods are now available in food markets, stores and catering establishments. Municipality departments, via public procurement, have increased their consumption of ethically-produced goods to set an example for citizens to follow. Municipal departments are working to increase awareness regarding consumer choice; advocating that consumers *do* create an influence on the global environment and working conditions. Together with *Svenska Naturskyddsföreningen*, (Swedish Society for Nature Conservation), Malmö has assembled a book explaining *what* ecological and fairtrade goods and food are, *why* consumers should choose such alternatives, and *where* they can be purchased (ibid). Such information is available on the city's website and is visible in grocery stores and small boutiques, as demonstrated in Figure 3-2.

Figure 3-2: Visibility of fairtrade and ecological alternatives in Malmö and Lund

Malmö has established several municipal goals associated to access and purchase of ecological and fairtrade goods. Between 2003 and 2008, 10% of all local farms should produce organic produce and by 2012, *100%* of food served in Malmö school cafeterias will be organic (Rolfsdotter-Jansson, 2006). Thus, via public procurement, the municipality attempts to alert citizens to alternative behaviours in the products they consume.

3.1.2 Agenda 21

Five years after the 1992 Rio Declaration, nearly all towns and cities in Sweden had adopted Local Agenda 21 or LA 21 (Malmö stad, 2002). Malmö was a bit slower due to the economic crisis of the early-mid 1990s (ibid). Consequently, the concept of LA 21 in Malmö was first motivated by student and local groups. This in itself exemplifies citizen participation. In 1997, the LA 21 initiative was unanimously adopted by the City Council.

An emphasis of LA 21 in Malmö is placed on informing and motivating the public *to take action* in improving the local environment and health of the city through behavioural changes and involvement. Specific goals and actions identified in Malmö's LA 21 include (European Academy of the Urban Environment, 2007):

- Malmö City taking a leadership role in local sustainable development;

- Valuable public information programs and documents created for citizens;

- Encouraging public participation, for example through City District structures;

- Maintaining a long-term approach.

Malmö's Local Agenda 21 described as a "blueprint for a quality environment and sustainable development" aims to manage the entire city (EAUE, 2007). It includes a description of the current situation and guidelines for further development (ibid).[68] The Environmental Programme for Malmö 2003-2008 aims to create a platform for sustainable development within the city (Malmö stad, 2003). Malmö's environmental goals include the following: achieving a more democratic society, improving dialogue with residents, reducing single-occupancy vehicles, a stronger local economy, reductions in resource consumption, and a generally *greener* and *healthier* city (Malmö stad, 2003; EAUE, 2007).[69]

3.1.3 Transportation Alternatives

Numerous initiatives aim to improve public transport in Malmö and reduce private vehicle use by providing more environmentally compatible local transportation (Malmö stad, 2003). Up to 40% of all journeys are by bike; an already high level of citizen participation (Reepalu, 2006, personal communication). Malmö has provided biking lanes, parking racks and *bike-only* avenues. Malmö is also aiming to improve bus and railway access, such as the extension of rail tracks. This will enhance convenience of public alternatives (ibid).

Technological influences in Malmö will help improve convenience when it comes to influencing behaviour related to public transportation. City buses in Malmö will soon have signal priority at traffic lights, by which signals will stay green for a longer period or change

---

[68] LA 21 reviews current environmental problems concentrating on air and water quality, threats to biodiversity and resource consumption (Malmö stad, 2002). Malmö's LA 21 is implemented through a variety of projects and initiatives. Amongst these are included: the Environmental Strategy for Malmö 1998-2002 and 2003-2008, urban development plans, city district participatory structures, programmes related to food and other consumables, and initiatives regarding traffic, waste, water and open green spaces (EAUE, 2007).

[69] To target youth, a children's book was published pertaining to relevant environmental goals of the LA 21, with 10,000 copies distributed to Malmö children between ages 6 and 8 (EAUE, 2007). Further, relevant films about LA 21 have been distributed, exhibitions organized in libraries, and a database created describing Malmö's ecological systems (ibid).

faster from red (Ringman, 2007). This will shorten bus journey time, making it more predicable and potentially faster than car travel.[70]

3.1.4 Involving youth and creating experience

Many programmes aim to interact with Malmö youth, as the nature of the thesis pilot-project demonstrates. Another project, known as *Klimat-X*, operated between 2004 and 2005 and reached over 2500 students together with their teachers (Malmö stad, 2006a). As experience is noted to be one of the strongest motivators for participation in environmental behaviour, *Klimat-X* worked with this notion via an interesting and interactive workshop (ibid). Students visited the sustainability centre to learn about solar energy technologies and experimented with various toy-vehicles running on solar power. These workshops engaged students, giving them a tangible vision of what sustainable possibilities can entail.

By the same token of engagement, this thesis project, discussed further in Chapters 4 and 5, also worked to involve students in the process of learning via a workshop-type activity. After the piloted study, the final outcome of this educational-tool will engage students in behaviour choice alternatives.

3.1.5 Sustainable Energy Citizenship

Malmö is also involved in EU projects to promote participation amongst European city governments and their citizens. SECURE establishes energy action plans, and tools by which to implement them (Malmö stad, 2006b). It also aims involve the public in sustainable energy alternatives. A local climate campaign associated to SECURE will engage residents regarding how to reduce energy consumption (ibid).

3.1.6 Augustenborg and Västra Hamnen: Infrastructure to influence behaviour

Malmö has also invested in innovative architectural designs to provide a *structural* urban environment that facilitates participatory behaviour amongst residents. Two well-known examples in Malmö are the neighbourhood communities of Augustenborg and *Västra Hamnen*, (the Western Harbour). *Västra Hamnen* was a project to refurbish an old industrial area into a new neighbourhood *centred* on sustainability. Augustenborg was the regeneration of a former socially and environmentally-challenged community. Both projects have captured international attention for urban renewal and industrial transition (James, 2002).

According to Ilmar Reepalu, Malmö's mayor, the best way to show visions of urban sustainability is with buildings and integrated systems (2006, personal communication). *Västra Hamnen*, built on former industrial grounds, does just that. Houses in *Västra Hamnen* are aesthetically pleasing, but also architecturally functional and sustainable, incorporating principles of passive housing (Malmö stad, 2004).[71] In terms of invoking public participation,

---

[70] About 50% of all journeys in Malmö are taken by car and 50% of these trips below five kilometres. However, as access to public transport improves, the benefits and barriers have shifted in favour of public options (Norling, 2007, personal communication). In fact, participation by bus and train is on the rise in Malmö, despite the opposite trend in other like cities in the European Union (Nilsson, 2007, personal communication).

[71] All of Västra Hamnen operates on 100% renewable energy which comes from pumping seawater, solar panels, wind energy and biogas from food compost (Malmö stad, 2004). This neighbourhood was designed to integrate biodiversity, a

Västra Hamnen provides an inspiring example of how to integrate sustainability. It is a popular place for study tours and curious residents (Reepalu, 2006, personal communication; James, 2002). Its design facilitates behaviour by making it *convenient* to use public transportation, incorporate home energy-efficiency, and induces *commitment* and *social norms* as waste separation facilities are located in public spaces; see Figure 3-3.

Figure 3-3: This waste sorting facility in Västra Hamnen, Malmö is located in a lighted, public and viewable location to motivate commitment to proper sorting.

Although once a neighbourhood plagued by abandonment, social conflict and environmental challenges, Augustenborg has become a leading example of environmentally-adapted urban renewal (Graham, 2002). Residents do more than merely admire intuitive designs and programmes pertaining to sustainability, they *live* them.[72] Residents share 13 recycling centres and have a 70% *voluntary* recycling rate. Augustenborg plans to increase this to 90% compliance within coming years (Kollin, 2003).[73] Residents demonstrate that transportation, energy, waste and water systems *can* be redesigned to increase participation, change behaviour and use natural resources more sustainably (ibid). This in turn benefits human health, improves community moral, boosts economic systems and protects natural resources.

3.2 Programmes and policies in Lund influencing behaviour, sustainability and the urban environment[74]

Housing a predominant academic institution, Lund is home to 40,000 students and 100,000 residents. Following the completion of the Öresund Bridge in July 2000, Lund sits as a strategic midpoint connecting Skåne to Denmark and the rest of Sweden. The location of the

---

green-space factor, culture, environmentally-sound transport and mixed use of space, including open streets and squares (ibid).

[72] With support of the municipality, Augustenborg residents have incorporated community gardens, protected natural habitats and integrated storm-water ponds to purify water before returning it to streams and rivers. In Augustenborg, green-roofs absorb rainwater through layers of small plants (Kollin, 2003).

[73] Beyond conventional recycling, residents also recycle garden and kitchen waste in a community composter (Kollin, 2003).

[74] Review of various programmes in Lund was first undertaken for a previous course entitled, Strategic Environmental Development in fall 2006. Thus, corresponding interviews are also from 2006.

university and many high profile companies, make Lund an increasingly popular and expanding urban community (Kummel, 2006, personal communication). Lund is a city in which many actors interact to ensure its quality of life and character are maintained in the urban environment (Wiberg, 2006, personal communication). Academics, urban planners, municipality departments as well as real-estate and construction companies provide Lund residents with a urban environment which attempts to incorporate attractive living equipped with municipal services, including public transportation and schools, as well as neighbourhood groceries and green areas.[75]

3.2.1 *LundaEko*: Local Agenda 21 in Lund

Lund has also adopted Local Agenda 21, referred to as *LundaEko*. This local Agenda 21 aims to reduce energy consumption, other than transport, by at least 25% (of its 1995 level) by 2005. While there are reductions in energy consumption in the industrial sector, less reduction is noted in the household sector (Birkedal, 2006, personal communication). This, despite technological and behaviour-related programmes implemented.

3.2.2 Motivating participation via increased incentives

Lund has incorporated many programmes related to influencing sustainable behaviour and has utilized various behaviour-change tactics (Birkedal, 2006, personal communication). Consumer incentives advocate environmental behaviours that improve lifestyle, health or save money. The Environmental Department has enacted several initiatives to shift energy-related household behaviour. This is considered a behaviour residents can influence (Hagberg and Fontell, 2006, personal communication).

Lund's City Planning Department has also attempted to increase the incentives to participate in alternative transportation methods, such as illustrated in the picture below, see Figure 3-4. This image depicts a simple road block which makes car travel impossible on some roads, but still enables buses and bikes to easily pass. Consequently, this provides added incentive (i.e. convenience) for citizens to participate in more sustainable transport options.

---

[75] The Urban Planning Department aims to build new housing along the 'Lundalink' to incorporate public transportation, making this alternative convenient and attractive (Kummel, 2006, personal communication). Brunshög, a project in Northeast Lund currently in the planning stage, involves planners, developers, architects and artists to envision a neighbourhood community, adjacent to central Lund, built to incorporate limited parking, access to public transportation, mixed use of space and an attractive environment to stimulate environmental behaviour (Wiberg, 2006, personal communication). Lund's Parks Department also works to include open spaces and green areas for local residents. Forty-three parks, exist and are accessible to residents (Blomberg, 2006, personal communication).

Figure 3-4: Image in Lund of a bus passing through a no-car zone. The physical setting prohibits car travel and makes it more inconvenient.

3.2.3 Existing energy-related behaviour programmes

Various projects including *Uppdrag kilowatt*, attempt to change household energy behaviour and improve efficiency (Lund Municipality, 2007). In *Uppdrag kilowatt*, laypersons were invited to fill out a questionnaire prepared by the municipality, which included enquires about energy use and governing habits. Based on responses, households received recommendations how to reduce energy consumption (ibid). The municipality then generated a checklist to track their energy consumption behaviour. Another programme, *Energiskolan,* worked to improve energy consumption in local schools, via technological and behavioural-related means (ibid). On a different note, the municipal energy advisor also organizes exhibitions for equipment manufacturers to showcase *energy-efficient* technologies.

Currently household energy consumption amongst citizens is the top priority for Lund's Environmental Department (Hagberg and Fontell, 2006, personal communication). Behaviour related to energy-consumption has received significant attention in relevant programmes. Environmental impacts associated to behaviour in waste generation, water consumption, or housing design alternatives have received less attention. Justifications from the municipality include an abundant supply of water, available land, and an already active level of participation in waste separation (ibid).

3.2.4 Involving citizens in Lund's waste management

Recycling, supported by source separation and treatment, is the main focus of waste management in Lund (Lunds renhållningsverk, 2006). The definition of recycling adopted by the municipality is broad and includes incineration with energy recovery (*waste-to-energy* recycling) (Gronhölm, 2006, personal communication). Collection, management and treatment are carried out by municipal departments: *Lunds Renhållningsverk,* for collection, and the multi-municipal-owned SYSAV, for treatment and management (ibid). Information regarding proper separation and handling hazardous materials is distributed on the website and via brochures. Opportunities to visit both facilities are available for students and children and a full-time advisor is available to answer waste-related concerns. Lund residents are *already* active in sustainable behaviours in waste management. Only 45% of household waste is collected in mixed form; the rest is sorted and recycled (Lunds renhållningsverk, 2006).[76]

3.2.5 Residents' Initiatives to incorporate sustainable behaviour

Desiring to promote low-impact living, local residents and architects designed and constructed *Solby Ecovillage* adjacent to Lund. Krister Wiberg, a lead architect in the project, worked with residents to minimize environmental impacts and utilize a *physical* arena to

---

[76] A survey conducted in December 2006 evaluated *perception* and *participation* in sustainable behaviour in Lund. Questions focused on choice and behaviour related to infrastructure, energy, waste, and consumption. Regarding waste separation, consumers are not provided incentives to separate waste, yet more than 50% of the waste is separated. Accordingly, an essential element to shift behaviour is to initiate *convenient* alternatives that stimulate the creation of a societal norm; in this case waste-related behaviour. (Some respondents informed us that they separate waste primarily because it is the norm in Lund. They did not want to behave in discordance to generally accepted behaviour) (Survey conducted for SED, 2006).

promote environmental behaviour (Wiberg, 2006, personal communication). Goals focused on reducing energy consumption, but also on maximizing infrastructure efficiency (ibid). Residents share common areas, including a community centre. The village includes easy access to public transport, schools and stores. By *concentrating* the living environment, Solby reduces impacts on the surrounding natural environment (ibid).

4 Development and implementation of the teaching tool

Lund and Malmö have engaged citizenry via provision of appropriate infrastructure and various programmes as discussed in Chapter 3. To provide tools by which to further incorporate environmental behaviour, Malmö intends to design an *interactive internet tool* for youth, enacted over summer 2007, as explained in Chapter 1.

Through statistics and illustrative descriptions, a piloted version of the interactive tool was created and tested during the thesis research. It attempted to demonstrate, for young persons, how *citizen behaviour can* and *does* influence our environment. Accordingly, this chapter is broken into two parts. First the development of the teaching tool and the strategies employed to do so are described in section 4.1. Next, section 4.2 describes the implementation of the tool in various stages. Such stages also consequently supported data collection and later evaluation of its effectiveness.

4.1 Community-Based Social Marketing as an effective solution

The community-based social marketing (CBSM) strategy, supported by empowerment evaluation, was considered the best alternative to implement the strategy. CBSM provided an effective guideline by which to carry out the study so that the message was not only information, but further, it attempted to provide an effective *link* to stimulate behaviour change. The relevant phases and their implementation are discussed below.

4.1.1 Communication Techniques

Communication was discussed at length in the literature review as this can either catalyze or discourage behaviour change (Windahl *et al.,* 1992; McKenzie-Mohr and Smith, 1999). Data and images were presented in such a way to cater to the target audience. As the target audience was primarily Swedish youth ages 15-18, it had to be effective in providing relevant information that could capture attention. Extensive graphical imagery, pertaining to energy and product consumption was utilized. (See Appendix 3 for presented information.)

It was presumed Swedish students had relatively high environmental awareness *already,* specifically in behaviours related to transportation and waste-separation (Fenech, 2002; Nilsson, 2007, personal communication; Ekenstierna, 2007, personal communication).[77] Thus, information presented was catered to support and encourage these *existing* behaviours, often through positive commentary and by emphasizing and empowering existing norms.

While awareness as to the impacts of food and energy consumption is also relatively high, behaviour is not always practiced accordingly amongst young persons or society in general (Norling, 2007, personal communication). Accordingly, such topics were thus emphasized during the presentation, as well as impacts of free-time activities.[78] Tips to *practically* reduce related environmental impacts in related activities were highlighted.

---

[77] This was confirmed by teachers, interviews and via observation.

[78] This included *specifically* items that youth may be interested in, such as particular types of food, clothing or other consumables.

Information was presented to *engage* students and, via empowerment evaluation, point out what they can do as young persons. Afterwards, in discussion, students were encouraged to contribute what they know or perceive about their environmental behaviours. As information campaigns that merely distributing information are not always effective, other techniques were implemented in order to grab attention and offer a more effective and 'colourful' message. See the Figure 4-1 below for a modified version of the presentation, and Appendix 3 for further details.
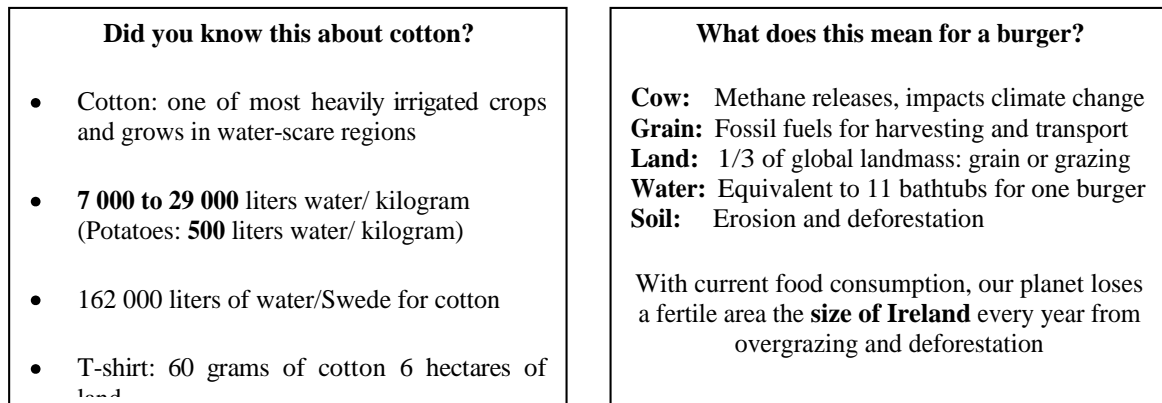
Did you know this about cotton?	**What does this mean for a burger?**
• Cotton: one of most heavily irrigated crops and grows in water-scare regions • **7 000 to 29 000** liters water/ kilogram (Potatoes: **500** liters water/ kilogram) • 162 000 liters of water/Swede for cotton • T-shirt: 60 grams of cotton 6 hectares of land	**Cow:** Methane releases, impacts climate change **Grain:** Fossil fuels for harvesting and transport **Land:** 1/3 of global landmass: grain or grazing **Water:** Equivalent to 11 bathtubs for one burger **Soil:** Erosion and deforestation With current food consumption, our planet loses a fertile area the **size of Ireland** every year from overgrazing and deforestation

Figure 4-1: Modified version of information presented to students to capture attention

Sources: UNESCO, 2002; WWF, 2003; WWF, 2007

4.1.2 Engaging commitment

To engage verbal and written commitments, the following techniques were utilized. After the presentation, the additional questionnaire asked students what specific behaviour change choices they would *commit* to. And also, what will they *commit* to do with information received. (See Appendix 2, post-questionnaire). The interviews provided a more in-depth opportunity to ask specific students about potential commitments. Both techniques, while seemingly minor, have significant psychological impacts regarding internal perceptions of *consistency* and can indirectly shift self-perception and resulting behaviour (Bell *et al.*, 1996).

4.1.3 Prompting Behaviour

As noted in the literature one of the largest barriers is *forgetting* to act environmentally (Bell *et al.*, 1996; McKenzie-Mohr and Smith, 1999). Thus prompting techniques were included. First prompting was considered in the visual imagery during the presentation, as noted both in Figure 4-2, and also in Figure 4-5. The images provide recognition of three common behaviour patterns that students perhaps are aware of, but via observed behaviour and interviews with Malmö's energy advisor, citizens often forgotten (Norling, 2007, personal communication). The images depict an uncovered pan to boil water. The second image illustrates boiling *too much* water for tea or coffee. The third image is a practical reminder, in Swedish, to take a shower for only five minutes.[79]

---

[79] Such imagery can in theory, help instigate behaviour change over time, via repetitive actions (Bell *et al.*, 1996; McKenzie-Mohr and Smith, 1999).

Figure 4-2: One of the largest barriers is forgetting. Visual imagery was used to prompt behaviour change.

4.1.4 Stimulating participation through incentives

Various materials, described in section 4.2, were given to students during and after the presentation to instigate participation, interaction, attention, and encourage students to stay for post-interviews. Such materials were multi-purposed: communicating a *tangible* message, prompting behaviour and providing curiosity and incentive to participate.

4.1.5 Uncovering external barriers and observing class norms

On several occasions after the sessions, a few students remained to discuss what they perceive as the largest barriers to their behaviour and if *they*, as young persons or students, can actually make a difference or experience a sense of environmental responsibility.[80]

Analyzing and instigating environmental norms was not relevant for this specific research, primary because of a lack of time availability for repeated visits. Thus norm theory only came into play when attempting to *re-emphasize* existing norms. However, the four schools visited were located in different communities in Malmö and Lund in which students specializing in diverse courses. As will be clarified in the Chapter 5, the influences of norms were observed in students' awareness and interaction and their resulting written responses.

4.2 Implementation of the teaching tool

The implementation exercise followed a sequential approach, see Figure 4-3. Incorporating various techniques to collect and demonstrate data had a two-fold benefit. First, it allowed for several methods by which to gather data for analysis regarding students' current knowledge and behaviour; and also to evaluate if such a method is an effective means of changing behaviour. Moreover, via suggestions of the literature review, it provided a platform for increased interaction with students, and utilized various techniques to bestow the underlying message. Together this can enhance engagement and potentially interest of students through various means, as will be described in this chapter.

---

[80] External barriers for students included weather and perceptions that most of their behaviour is dictated by parents, or a lack of money.
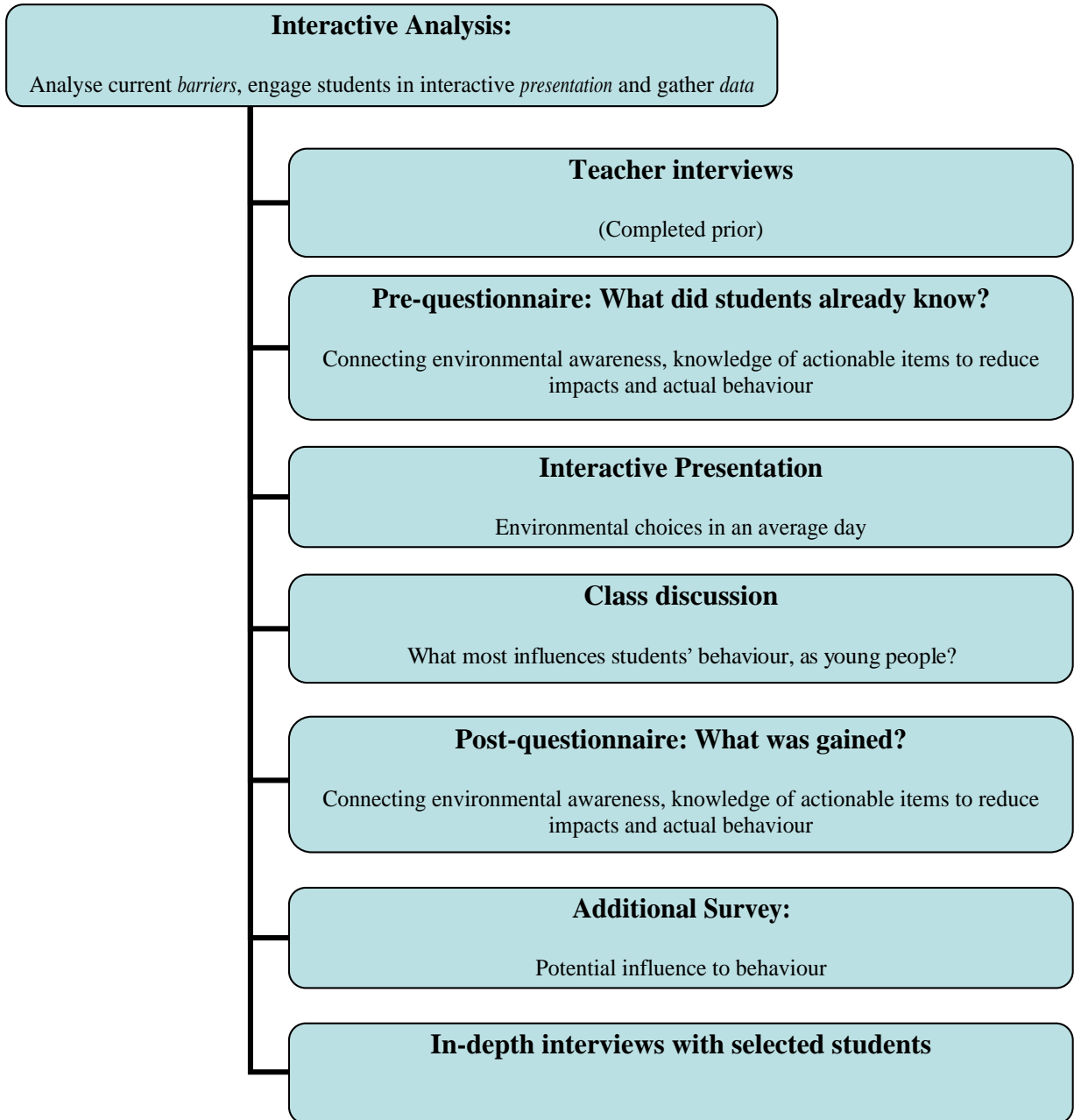

Interactive Analysis:

Analyse current *barriers*, engage students in interactive *presentation* and gather *data*

Teacher interviews

(Completed prior)

Pre-questionnaire: What did students already know?

Connecting environmental awareness, knowledge of actionable items to reduce impacts and actual behaviour

---

Interactive Presentation

Environmental choices in an average day

Class discussion

What most influences students' behaviour, as young people?

Post-questionnaire: What was gained?

Connecting environmental awareness, knowledge of actionable items to reduce impacts and actual behaviour

---

Additional Survey:

Potential influence to behaviour

In-depth interviews with selected students

Figure 4-3: Series of stages for implementing case study exercise, and methods by which to gather data

Prior to conducting the workshop, interviews were held with teachers. This helped cater the presentation and information to what was most relevant and interesting for students in the various classroom settings. Further, it allowed for a better evaluation of the results received and potential factors and barriers influencing student behaviour in general and specifically pertaining to their varying programmes. [81]

---

[81] For example, demographic factors are considered to be a strong influence on behaviour as was proved in various Swedish research studies (Lindén, 2007, personal communication).

The pre-survey, conducted in Swedish, was given to students regarding present environmental awareness and consequent behaviour. (See Appendix 1: Pre and Post-Survey in English and Swedish). The survey was conducted in Swedish for students to express themselves in their native language without hesitation due to a language barrier.[82] This survey attempted to analyze what *triggers* behaviour by assessing the *link* between current awareness of environmental impacts, knowledge of tools to reduce impact, and what actual behaviour is in various daily endeavours. Furthermore, the survey set the scope as to what would be discussed during the seminar by capturing students' attention. Figure 4-4 illustrates the link between the questions asked in the pre- and post-survey.

How do the choices *you* make at various stages in a day impact the environment and create emissions?

(Knowledge of impacts)

What specific actions are *you* aware of as to how *you* can reduce *your* impact?

(Awareness of tools for prevention)

What specifically are *you* doing to reduce *your* impact to the environment?

(Influences or links to environmental behaviour)
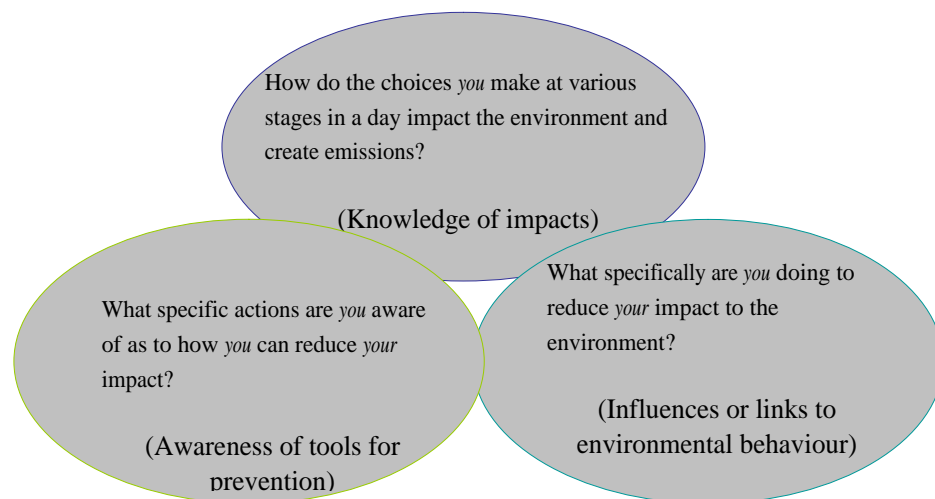
Figure 4-4: Questions asked in the pre- and post- survey

Next an interactive presentation discussed with students *how* daily choices create environmental impacts, and also specifically, what students, as individuals, can do to reduce impacts. The presentation was conducted in English, as this is the thesis author's native language of expression, and because students in upper education have confidence in understanding English, as assured by their teachers.

After the presentation, students were made to feel 'involved' in the process of research findings via a discussion and interaction, according to methods of empowerment evaluation (Fetterman, 2001). They were asked questions pertaining to what insight they could provide regarding primary influences in their patterns of behaviour.[83] This approach attempted to

---

[82] The thesis author has a basic comprehension and ability to read and understand Swedish.

[83] It was assumed that engaging students in such a discussion could potentially stimulate their *own self-reflection* regarding environmental behaviours.

make students feel as though they were *given a stake* in the academic process pertaining to environmental behaviour research and that their opinions and information was highly valued.

Following the discussion, a post-survey was given with in the same format; see Appendix 1. This tested theoretical and practical knowledge gained. Additionally, a second questionnaire asked specifically what students will *commit* to do with information received. (See Appendix 2: Additional Questionnaire, in English and Swedish). The post-questionnaire attempted to examine ingestion of information received and evaluate *if* such a communication tactic for presentation of information and advice will influence behaviour.

Before the end of the class period, various materials were distributed to students to attempt to make the message *tangible* and *prompt* their adoption of additional environmental behaviours. Distributed items include: the latest *WWF Report for Sweden* with many graphical images and data catered to youth, pencils made from recycled plastics, and stickers (see Figure 4-5) reminding students to *turn off* their lights and standby equipment. Such physical items attempted to make the session livelier, concrete and *hopefully*, impacting.

Figure 4-5: Images of items distributed to students, such stickers can 'prompt' energy consumption behaviour[84]

After class, semi-structured interviews were held with 15 selected students.[85] As students at the high-school level may face peer-pressure to perform or act a certain way, or feel reserved in open discussion, it was assumed interviews could provide a more sincere answer regarding environmental behaviour. The student interviews supported the post-questionnaire with a more in-depth examination of influences and barriers, as well as student *perception* of situational control and responsibility, and general perception of optimism for the future. Understanding awareness cannot be analyzed via a 'yes' or 'no' response and thus, students were asked about their awareness and behaviour via qualitative open-ended questions.

As mentioned the literature provided the analytical framework and guideline by which to implement the study. In order to *implement* an effective and relevant environmental educational tool for students, first factors influencing behaviour were considered and potential strategies by which to transmit knowledge and tips regarding environmental

---

[84] Stickers are from Malmö's Energy Advisor and photographic images taken by the thesis author, spring 2007.

[85] About five students from each school were interviewed.

behaviour.[86]   Prior interviews with teachers helped to streamline the presentation so that information presented would be interesting, but not redundant to what they already know. Instead, it aimed to build on current knowledge levels.

---

[86] This included the influences of media, infrastructure, social capital amongst students, culture and feasibility.

5 Analysis and evaluation

In this chapter the theoretical perspectives presented in the literature review are applied to the case study. This includes the influential factors discussed in Chapter 2, as well as the case-specific barriers emphasized by the students during the student-interviews and classroom discussion. As the various students study different courses in different schools, this can consequently shape their awareness, their classroom norms and influence their corresponding participation in environmental behaviour. Thus, the information has been analyzed both collectively and via classroom experiences.

This chapter also includes an effectiveness evaluation of the educational-tool that was developed. This includes the method that was applied and whether or not students found this to be an effective means by which to influence and encourage participation in environmental behaviour.

5.1 General characteristics of the schools and classroom settings

The three schools visited were located in different parts of Lund and Malmö in which students studied various courses and disciplines. This section provides general information about the different respective schools, as well as the classrooms in which the study was conducted. Interviews with teachers, as well as the results of the student surveys constitute the main sources of information. Information regarding the classes and their coursework is summarized in Table 5-1, Table 5-2 and Table 5-3.

5.1.1 Natural science students at Lund's Katedralskolan

Katedralskolan is located in close proximity to the center of Lund. It has about 1200 students who study a variety of courses including natural and social sciences, business administration and an international baccalaureate programme. Students in the class visited are attending the natural science programme, (*Naturvetenskaps-programmet*).

Magnus Ekenstierna, a biology teacher at Katedralskolan stated that most of his students come from familial academic backgrounds and have access to various opportunities accordingly (Ekenstierna, 2007, personal communication). About 30% of his students replied that they *sometimes* eat organic foods in the home and according to survey answers; nearly all students demonstrated a relatively high level of perceived awareness of environmental problems. Their behaviour reflected some participation accordingly. A majority of Mr. Ekenstierna's students live in and around Lund and can easily access school via bus or bike.[87] Some students also answered that they walk to school as it is quite close. Out of the 31 students that answered surveys on the day of the visit, only three responded that they arrived by car.

As noted in Table 5-1, partially due to what students in Mr. Ekenstierna's class study, they possess a relatively high level of awareness of environmental problems and impacts prior to the survey. This awareness was particularly strong regarding transportation-related impacts, and standby energy as Mr. Ekenstierna had discussed such issues in class (Ekenstierna, 2007, personal communication). Most students stated that they sort waste in the home, although

---

[87] This was pointed out in the discussion with students.

(at least) three (10%) students admitted to throwing trash in the landscape and six admitted to not sorting waste. However, as waste-sorting behaviour is quite high in Sweden and the case of Lund, about 80% of students can be assumed to sort some waste on a regular basis.[88]

The post surveys reflected an increased awareness regarding specific environmental and energy impacts related to food, clothing and energy consumption in daily activities. Students also pledged to incorporate behavioural changes according to reflected learning, generally by simple and employable means.[89] Such behaviour was reflected by their statements regarding impending environmental behaviour, and also, regarding treatment of their classmates and peers. One student-respondent stated, *"I will stop teasing vegetarians."*

Students in classes visited at Katedralskolan had a high confidence in spoken English and were active in discussions and post-interviews. Several students stayed afterwards to continue discussion or pose questions about potential environmental queries and asked for further information.[90] Interviewed students were asked about their potential future plans after gymnasium. These students stated that they planned to work, travel, or perform military-service. One student stated that she wanted to study medicine and work for *Doctors without borders* (Student interview Katedralskolan, 2007, personal communication).

Table 5-1: Study Visit One, 27 April 2007: Katedralskolan in Lund

Teacher interview: Magnus Ekenstierna	Classroom 1	Classroom 2
Number of students in classroom and school	18 students in class, 1200 students in school (15 answered surveys)	20 students in class, 1200 students in school (16 answered surveys)
Main subjects/ courses studied that reflect environmental issues	*Natural Sciences*: Ecology, vegetation, history of the Earth, greenhouse gas emissions	*Natural Sciences*: Ecology, vegetation, history of the Earth, greenhouse gas emissions
Teachers' perceived environmental awareness of students	Good: discussed energy impacts associated to standby and transport	Good: discussed energy impacts associated to standby and transport
Age of students	17, 18	17, 18
Where do students live?	In and around Lund	In and around Lund
How do students arrive?	Bus, train, bike, walk primarily	Bus, train, bike, walk primarily

5.1.2 Social science students at Malmö's Heleneholms Gymnasium

Heleneholms Gymnasium is located in Augustenborg, Malmö. About 1150 students attend the gymnasium which has several programme focuses, including social sciences, natural sciences, as well as aesthetics (*estetiska* in Swedish) and an individual-learning programme. As mentioned in section 3.1.6, Augustenborg has, in recent years, been the centre of a variety of programmes to revitalize and rejuvenate infrastructure and the community's social capital. Thus, for students coming from the community, many may have been influenced by enhanced community moral and reflected norms accordingly, or at least *indirectly* they have been a witness to this process. However, according to geography teacher Jeanette Gruner-

---

[88] This gathered from their responses, and previous knowledge of waste separation trends.

[89] I.e.: eat less meat, buy organic foods and take shorter showers, etc.

[90] This was in addition to the student interviews.

Viig, not all the students attending Heleneholms come from Augustenborg, but also from other neighborhoods in Malmö; see Table 5-2 (2007, personal communication).

Students in the classroom are attending a social science programme, (*Samhällsvetenskaps-programmet*). Ms. Gruner-Viig stated that students possess a relatively high environmental awareness *already* (2007, personal communication). According to Ms. Gruner-Viig this is reflected in their writings, their discussions and also influenced by the high *visibility* of environmental issues in media coverage in Malmö (ibid). Student responses reflected results accordingly, particularly by means of transportation, waste separation and a few students reflected consumption of ecological foods. All students came to school by bus or bike. A few *occasionally* arrived by their parents' car. Many students stated that they attempt to turn lights off when sleeping and unplug standby devises *when* they remember. Regarding awareness of food impacts, Ms. Gruner-Viig's class had two vegetarians, both females. In all classes visited, students were questioned about their food choices, but this was the only classroom with vegetarians. When asked, the two students responded that their primary motivation was animal-welfare, but more recently, was justified also by environmental concerns and implications of climate change.

Students visited at Heleneholms studied social sciences and had a high command of global environmental challenges.[91] During discussion, students were active and made comments in both English and Swedish, depending on their level of confidence. Afterwards several students engaged in further conversation regarding collective impacts of behaviour and choice. In survey responses, there was a general attitude and commitment to change, particularly in areas of food consumption, packaging alternatives, clothing consumption and standby electricity.

Only three students of the 23 (13%) who answered surveys stated that the presentation will have no impact on their behaviour. Reasons for two of these students were that they *already* knew most of the general information and advice provided, and only received a few new interesting facts. The remaining student did not feel as though he or she could make any difference anyway.[92]

---

[91] This was concluded, as per discussion with Jeanette Gruner-Viig and via personal observation during the classroom visit.

[92] This student commented that most of the household decisions (and thus, corresponding behaviour in the perception of the student) are made by the parents. For example, when asked about food choices, the same student respondent wrote, *"I eat whatever my parents cook me."*

Table 5-2: Study Visit Two, 30 April 2007: Heleneholms Gymnasium in Malmö

Teacher interview: Jeanette Gruner-Viig	Classroom 1
Number of students in classroom and school	30 students in class, 1150 students in school (20 answered surveys and 23 questionnaires)
Main subjects/ courses studied that reflect environmental issues	*Social Sciences*: Geography, civics, some environmental science in a different department at the school
Teachers' perceived environmental awareness of students	Good: Watched 'An Inconvenient Truth' in class recently, many students discuss and choose to write about environmental issues in essays
Age of students	16, 17
Where do students live?	Different neighbourhood-communities in Malmö
How do students arrive?	Bus, bike primarily

5.1.3 Vocational science students at Lund's Gymnasieskolan Vipan

The final class visit, on 2 May 2007, was to Gymnasieskolan Vipan in the outskirts of Lund. Gymnasieskolan Vipan is a large school with about 1500 students. Amongst the academic programmes listed in the other schools, Vipan also has many specialized skill-related programmes. The students in the classroom attended are studying to be electricians, (*El-programmet*). This course is one of only two possible programmes in and around Lund and Malmö. Consequently, many students attending the programme come from surrounding towns and villages; see Table 5-3.

The two teachers, Conny Knutsson and Tommy Lindström, were supportive to the thesis research project, but also honest about what they perceive to be the present levels of awareness and behaviour of their students. Students in the electrician programme are studying primarily vocational sciences and not academic sciences. Thus, their educational learning is unique to the other classes attended. Students have the opportunity to partake in study visits and possible internships, via support of their teachers.[93] However, students have less corresponding theoretical studies. In the pre-interview, teachers admit that their class *does not* have enough general awareness pertaining to environmental issues, but that the curriculum and learning does focus on relevant environmental and energy-related information for the students' learning (Knutsson and Lindström, 2007, personal communication). This includes environmentally-labelled products, handling of material and construction waste, environmental regulations applicable for Sweden and the European Union and environmental certifications, including ISO 14001 (Knutsson and Lindström, 2007, personal communication). Students are informed about standby energy consumption as was discussed with Mr. Knutsson, Mr. Lindström and other teachers (ibid).

Their prior *theoretical* awareness was somewhat lower, as was their corresponding behaviour, including transportation-related behaviour.[94] However, as this is a specialized programme,

---

[93] Mr. Knutsson and Mr. Lindström stated that currently, there is a high demand for electricians in the area. Thus practical experience, provided through internships, can facilitate forthcoming work opportunities upon completion of the programme (2007, personal communication).

[94] This was based on the responses in the pre- and post- survey and in the post-discussion with students.

some students come from farther away and thus drive because of a lack of alternatives or due to preferred convenience.

Generally as comments in the post-questionnaire revealed, most students have a greater confidence in the role technological improvements play regarding alleviating environmental burden and were less enthusiasm about *behaviour*. In fact, 30% (8 of 24) questionnaires received stated that the presentation or tips would have *no impact* on behaviour.[95] Despite information to the contrary demonstrated in the presentation, students justified this response by stating that they did not feel that their impact made a significant difference. The other 70% of students however, stated that they would make a conscious attempt to take, amongst other things, shorter showers, use alternative transportation or turn computers and other apparatuses off when not in use.

Why did this class have such a differentiating response, despite enthusiastic and dedicated teachers and similar access to infrastructure and media? This can partially be explained by localized norms and behaviour in the classroom setting. Interestingly, all students were young males, which have been found to be the largest energy-consuming group in Sweden.[96] Male students, particularly in technical fields, are generally least influenced by behavioural change programmes. A more *practical* application and demonstration of such methods may prove to be more effective.[97]

Table 5-3: Study Visit Three, 2 May 2007: Gymnasieskolan Vipan

Interview of Teachers: Conny Knutsson and Tommy Lindstrom	Classroom 1
Number of students in classroom and school	27 students in class, 1500 students in school
Main subjects/ courses studied that reflect environmental issues	*Vocational Sciences*: Most courses are centred around electrical work and aiming for practical opportunities such as internships and employment
Teachers' perceived environmental awareness of students	Inadequate: Teachers stated students do not have enough awareness; but do discuss environmental product regulations, ISO and EU standards
Age of students	17, 18 (all male students)
Where do students live?	Within 20 kilometres of Lund: one of few electrician programmes in Skåne.
How do students arrive?	Bus, bike, car primarily

5.2 Factors influencing sustainable behaviour in case-study schools

By and large, the analysis found students to have a fairly widespread understanding of environmental issues, particularly related to climate change, *already*. To understand some of the reasons for this, students were asked in the post-interview and discussion regarding some of the factors that influence their current behaviour and what factors could potentially provide the situation for instigating their behaviour. Student responses were evaluated against factors included in the literature review to see if such factors hold leverage in influencing present behaviours amongst students.

---

[95] Such an assumption was based on data received in the post-questionnaire.

[96] As was discussed in section 2.2.4 of literature review, based on a personal communication with Professor Anna-Lisa Lindén.

[97] Particularly since these students attend an educational programme that is more *practical* in nature.

5.2.1 News media, information campaigns and visibility

As per the observational analysis and literature review, students confirmed that one of their greatest influences came from media attention. Swedish media in general, as well as local news coverage, advertising and outreach from municipal programmes depict environmental concerns. Such reporting and consequent exposure has had a significant impact for students according to their comments (Student interview Katedralskolan, 2007, personal communication). Another student however stated that while media is effective in conveying attention and increasing awareness, it does not necessary influence behaviour (Student interview Heleneholms, 2007, personal communication). One reason for this is that large-scale media campaigns may not cater to a specific audience to provoke change. Campaigns catered specifically to youth may prove more effective. Despite its inability to directly influence behaviour, students interviewed in all three classes admitted to media as an important factor in generating curiosity and attention to the issue, and thus, is perceived to *indirectly* influence behaviour.

Most students found information to be helpful to increase their level of awareness and potentially, corresponding behaviour. However, this was also determined by what behaviour was considered. As the young persons examined are currently students, they are *already* in a learning environment, and thus are perhaps conditioned to the positive aspects of information campaigns. Many students mentioned environmental documentaries and information received in the classroom regarding environmental issues.

However, according to written and verbal responses, information campaigns can also have a negative impact. A common justification for non-behaviour from students stemmed from a sense of hopelessness and information overload. When asked how they view the future, students interviewed had generally a negative perception. They stated that while they believe humankind will *eventually* modify behaviour, it will presumably be *too late* to create positive change, in this case regarding global warming (Student responses Katedralskolan, 2007, personal communication).

5.2.2 Experience as an influence to behaviour

Experiences can make behaviour concrete and demonstrate the *feasibility* of related choices and actions. For students interviewed, a few stated that time spent in nature with families influenced their relationship to the environment and others stated that courses in school or various trips held merit and influenced their corresponding behaviour (Student interview Heleneholms, 2007, personal communication). Other students stated that *perhaps* it shaped their behaviour, but admitted that they had not much considered the role of experience (Student responses Vipan, 2007, personal communication).

5.2.3 Norms and cultural values

Regarding social and cultural values, most students interviewed considered environmental norms quite high in Sweden, and in their school environment (Student discussion Heleneholms and Vipan, 2007, personal communication). They also stated that social pressures to perform environmentally bestowed a strong influence to their participation in environmental behaviour or activities (ibid). Students interviewed stated that much of their motivation regarding recycling, for example, is shaped by norms, values and attitudes (Student interview Heleneholms, 2007, personal communication).

However, not all cultural norms support environmental behaviour. For example, when asked, many students admitted to either leaving a light on in their room when they were not in the room in order to maintain a pleasant, inviting impression or leaving the window open *slightly* during the winter to receive fresh air while they slept.[98]

5.2.4 Demographic influences and generational foundations

All students interviewed were about the same age, ranging from 16-18, and can be assumed to have similar levels of education at present. While this may change in the future, they are on a comparable platform at the moment. However, demographic figures played a role in attitudes and potential acceptance of behaviour, particularly across the gender line.

As mentioned in Section 5.1.2 the only students who were vegetarians were females studying social sciences (Student discussion Heleneholms, 2007, personal communication). Further, while male students were active in class discussion in the natural and social science courses, it was primarily female students who stayed afterwards to discuss behaviour alternatives. Students in the vocational course, while respectful and attentive during the seminar, made less efforts to engage in post-discussion and interviews, or remain afterwards.[99]

While it is difficult to fully assess reasons for behaviour, the impacts of various demographic and social factors were observed according to student behaviour in the classroom and their responses in discussion, interviews and written surveys which varied between different classroom settings and across gender lines.

The workshop activity attempted to emphasize the role of a changing system, particularly regarding generational factors and *access*.[100] Many students admitted to this as a factor influencing their behaviour, particularly in energy and food consumption choices. During the presentation, students were asked, by show of hands, how many of them leave their computer and other like appliances on simultaneously. They were also asked if they eat exotic foods on a regular basis. To both of these enquires, nearly every student raised their hands in all four classrooms.

5.2.5 Beliefs, attitude, and emotional involvement

Via observation, environmental attitudes appeared to be high amongst students; but as assessed in their verbal and written responses, this did not always correspond in related behaviour. Further, there was little indication, at least from student responses and discussion of a perceived *emotional* attachment to nature. However, most students interviewed were from semi-urban areas and may interact less with the natural environment.[101]

---

[98] Similar behavioural patterns have been observed throughout Nordic countries who may attempt to cope with the long dark winter by maintaining lights in the home (Lindén, 9 May 2007).

[99] This could have occurred for various reasons: perhaps related to confidence (or lacking confidence) to converse in English, or because the class fell right before their lunch break.

[100] The following example was given: *In the 1960s, an average European grocery story had 2000 product lines. A modern supermarket has more than 15,000* (EEA, 2005). What young persons consider as *normal access* has expanded in the past 40 or 50 years.

[101] According to Professor Anna-Lisa Lindén, as society becomes more urbanized and without corresponding experiences in nature, we *can* lose our emotional attachment to the natural world and our *practical* knowledge of how to implement seemingly environmental behaviour (2007, personal communication).

5.2.6 Responsibility, efficacy, and altruistic behaviour

Many students felt a general lack of power to change behaviour, particularly in their homes where it was stated that most decisions are made by their parents. When asked what food they consume, one student wrote *"Whatever my parents make"* (Heleneholms). Another student stated, *"Whatever they serve at school"* (Vipan). According to these students, they sensed limited efficacy in the power of their personal behaviour. Interestingly, these same students also stated that such information will have little influence on their behaviour (Student responses Heleneholms and Vipan, 2007, personal communication).

Additionally, students admitted that it was difficult to understand how their individual choices impact the environment. A repeated written and verbal comment from students was that it is often difficult to *see* the collective impacts of energy consumption or consequent waste production (Student interviews Katedralskolan, Heleneholms and Vipan, 2007, personal communication). Students were surprised to find out how much land it takes to make a T-shirt or how many coffee beans are in a single cup of coffee.[102]

Although a smaller percentage of students, some did perceive a sense of responsibility as an influence to their behaviour. Students from the social science course wrote the following comments post-presentation regarding what they learned and the role of their behaviour. One student wrote, *"Everyone can make a difference, whether it is large or small,"* (Student comment Heleneholms, 2007, personal communication). Another student noted, *"Everyone can do something to improve their behaviour and the planet,"* (ibid). Such sentiment, according to literature, can influence one's level of participation in behaviour or non-behaviour.

5.2.7 Social Capital

Young persons interviewed also considered social capital and the social environment at their school to be an important aspect influencing their behaviour. Students stated that particular influences to their behaviour include friends, school and the surrounding perception of a related identity (Student interviews Katedralskolan, Heleneholms and Vipan, 2007, personal communication). As students spend significant time at school, this environment lends learning, friendship, a platform of exchange and experience and inherently, community. Thus, building camaraderie towards environmental behaviours and creating school norms engrained with environmental values can be greatly supported by enacting and utilizing social capital existent in school environments.

5.2.8 The physical environment and infrastructure

According to student interviews, Lund and Malmö were considered to have apt infrastructure to facilitate various choice alternatives. When asked about environmental behaviours that students are *currently* participating in, about 85% stated that they walk, bike or bus (Student responses Katedralskolan, Heleneholms and Vipan). Other behaviours which students are participating in extensively include recycling and composting which as discussed, are also supported by sufficient infrastructure.

---

[102] It takes 100 beans per cup of coffee and one cotton T-shirt requires 6 hectares of land (Ryan and Durning, 1997). Such facts were shared with students.

5.2.9 Safety, convenience and practicality

Safety and access were amongst the factors consistently mentioned by students. When asked, only a few students acknowledged that they had a driver's license. Driving was not perceived to be a priority for students because alternative transport methods were considered affordable, frequently available and sometimes *more convenient*.[103] Continuing to support such a perspective, or student norm, can be vital in order to shape their future behaviour as adults.

However, students also admitted to putting individual pursuits and desires over environmental gains, especially when money and time were involved. One student commented, *"Maybe if it was easier or more convenient, then I would improve my behaviour,"* (Student comment Heleneholms, 2007, personal communication).

5.3 Primary barriers acknowledged by students

According to students, various barriers are strong deterrents to their behaviour in all three schools visited. As barriers are necessary to overcome before successful implementation of behaviour change, these were discussed at length.

5.3.1 Limited say in financial choices in the household

Common barriers to environmental behaviour for high-schools students included lack of money, and that fact that primary responsibility for products and consumption was their parents' choice. When asked if the educational tool will change his/ her behaviour regarding environmental choices one student wrote, *"Maybe a little, but anything that involves me spending money will probably be forgotten."* Particular for students, without much economic viability of their own, *money* is a significant barrier justifying non-behaviour.

5.3.2 Lacking awareness, lacking alternatives and laziness

While awareness regarding *environmental problems* was quite high, students admitted to not necessarily knowing *how* to reduce such impacts or *where* they could access information or tips to incorporate environmental behaviour (Student interview Katedralskolan, 2007). All classes also openly admitted that laziness and *perceived* difficulty were primary barriers to their behaviour (Student interviews all schools, 2007, personal communication).

5.3.3 Temporal or place discrepancy

Students were quite confident that the presentation would change their behaviour *at least temporarily.* However, a few students commented that they would incorporate such behaviour only for *"as long as I remember them."* Additionally, *forgetting* was a primary barrier for students when trying to implement environmental behaviour. Students commented that they often forget to turn off their computer or lights, even if they know they should (Student interviews Heleneholms and Vipan, 2007, personal communication).

---

[103] This depended on where the students were coming from.

5.3.4 Unintended consequences of technological improvements

An additional barrier mentioned by students was, *in fact*, the present energy mix providing power in Malmö. One student at Heleneholms Gymnasium commented, *"Our energy already comes from sustainable sources, such as hydropower, that do not pollute the environment as much. And in the future, we will get our energy from nuclear fusion, so we do not need to adapt our behaviour too much,"* (Student comment, 2007). This student thus, rightly or wrongly, had a high confidence in technology's pending and present ability to alleviate environmental burdens and did not assume that behaviour change could account for the same impact.

5.3.5 Attitude-behaviour measurement and current perceptions

When asked during the presentation, about 80% of students believed that their present behavioural patterns were *already* quite environmental (Student discussion Katedralskolan and Heleneholms, 2007, personal communication). This *can* create a foundation for encouraging new environmental behaviours, amongst students by fostering and strengthening present environmental norms. However, it can also act as a barrier to incorporating new environmental behaviour. *If* students *already* assume that they are doing their *share* for the environment, it removes a sense of responsibility. Case in point: while students may be correct in their assumptions in some regard, their lifestyles are far from sustainable, according to a recent report from WWF Sweden. This revealed that, via ecological footprint theory, the average Swede requires *four planets* to maintain a current lifestyle (WWF, 2007). Thus, *what are the behaviour-related impacts of young Swedes and how can behaviour shift to reduce impacts and improve sustainability?*

Understanding these barriers, from the perspective of the students, is essential before any strategy can overcome negating factors and achieve effective behaviour change. Figure 5-1 sums up the primary barriers as expressed by students in the classrooms visited.
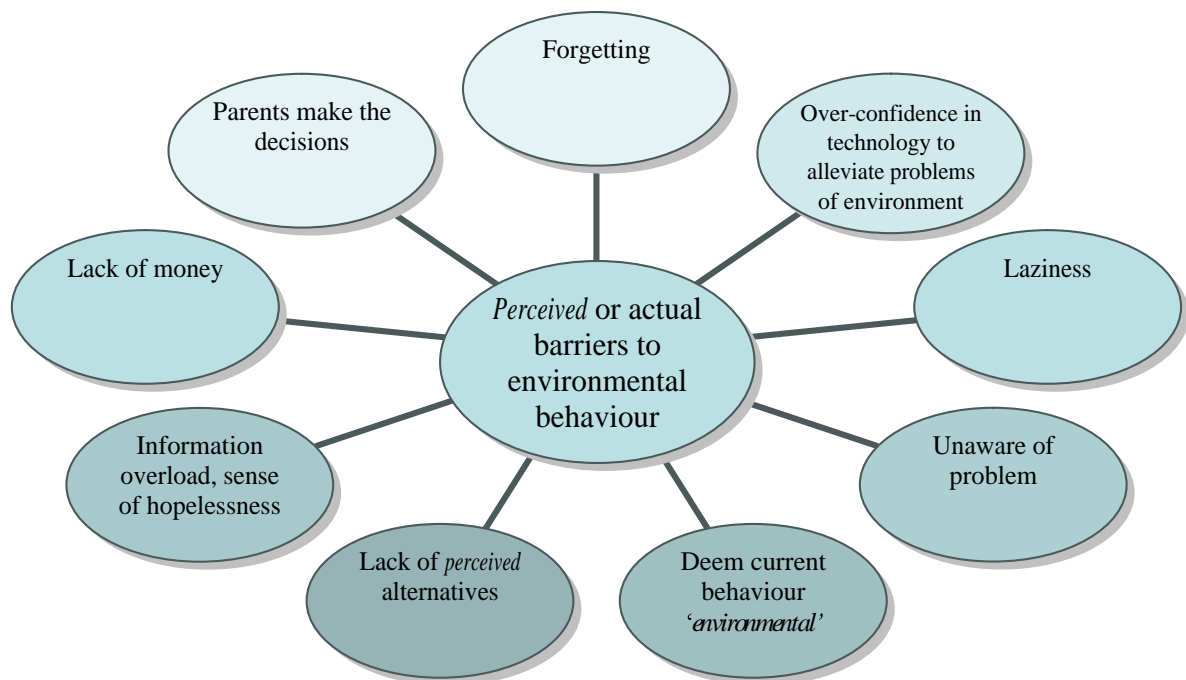
Figure 5-1: Summary of primary barriers for students before engaging in environmental behaviour

5.4 Evaluating the effectiveness of the teaching tool

While the pre- and post- survey was qualitative in its approach to allow for open-ended answers, the post-presentation questionnaire followed a more quantitative methodology. This attempted to grasp potential behaviour change and evaluate if such a communication strategy was effective. Students were asked an open-ended question regarding what they had learned (and what will they do), but also whether such information/ advice will change their behaviour. Out of the 77 students who responded to the post-questionnaire, only 12, or 15% of the students stated that the presentation will either not impact behaviour (nine respondents) or they were *unsure* if they will implement behaviour change (three respondents); see Figure 5-2.
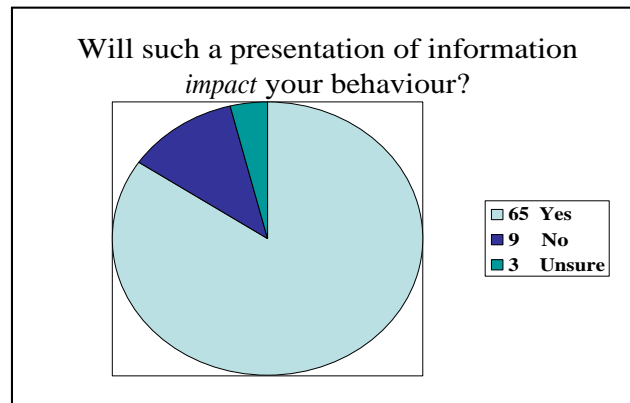
Figure 5-2: Reflections of student responses

According to the generally positive responses of students, it can be assumed that such an educational-tool utilizing knowledge transfer was effective in influencing behaviour to some degree, even through a one-time application. The pedagogical strategies employed were able to provoke interest, attention and curiosity in students.[104] Responses to the questionnaires generally reflected an *increased awareness* regarding overall environmental impacts, particularly related to energy-consumption and related emissions to climate change. When asked what they had learned, one student responded, *"That almost everything we do plays a role in affecting the environment."* General responses seemed to reflect a similar demeanour of an increase in awareness, but also a *feasibility* to implement *simple* behaviour changes. Overall reflection can be summed up loosely as such: our actions *are* impacting the environment, *small actions are not really so difficult* to execute, and *other people are getting involved* too.[105]

But why did student comments reflect such a positive result? Due to only short time availability, the presentation attempted to describe *small*, but *feasible* actions, targeting and encouraging students to make *small behaviour-change* choices. While this may not be life-changing, it can be assumed to be an effective use of the time based on student comments received. Generally instead of focusing on broad or abstract messages, the presentation attempted to depict easy examples of what students could do, *today*, to change their every-day

---

[104] This assumption is based on student and teacher comments after the workshop and also by observation that 3 out of the 4 classes opted out of their allotted break period because (as stated) they were interested in the information presented.

[105] An example included in the presentation depicted what other young people in various locations in the world are doing. Such an example demonstrated that making change is possible and is being done. Other examples shared with students pointed-out existing norms, in Lund and Malmö to encourage additional support or re-confirm positive social values.

behaviour.[106] The 65 students that said they *would try* to change also listed one or two simple environmental behaviours by which to do so. Amongst other responses, these included: taking shorter showers or turning the water off, reusing plastic bags, turning off the computer before sleep, boiling water in a kettle, biking instead of driving, opting *not* to buy bottled water, shutting the window in winter months, and choosing ecological food. By committing to one or two behaviour changes, students changed their perception and acknowledged that they could see an *increased feasibility* of incorporating such behaviour changes. Further, as previous studies indicated, committing to one or two *simple* behaviour changes can change *internal-perception* in a positive way and encourage other environmental behaviours. This connects *practical* and *theoretical* knowledge and related alternatives.

5.4.1 Strategies to transmit knowledge and influence behaviour

"Few things are harder to put up with than the annoyance of a good example."

-Mark Twain

Primarily, the educational tool attempted to identify energy consumption in an average day and how behavioural choices *can* reduce energy consumption. Beyond common assumptions regarding the energy use of a light bulb or computer, it tried to remove the *invisibility* of energy, by pointing out that energy is a part of all products: the food we eat, the clothing we wear, our cooking, cleaning, transport, packaging, showering time, etc. It is included in everything we do and in every purchase we make. But because we do not see it or touch it, it is often a difficult concept to understand. Through suggestions included in the analytical framework, the educational tool attempted to do just that.

5.4.1.1 Recognizing and minimizing perceived barriers

As was assumed, students have a high awareness and consequent behaviour in certain activities, i.e. transportation and recycling behaviour. Correspondingly, barriers are perceived to be quite low in these activities. Students *perceived* greater barriers to other activities including energy consumption, food choices, free-time activities, etc. However, through applicable tips, it was demonstrated to students that they *do* have the ability to change their behaviour and reduce impact. Visual imagery throughout the activity demonstrated the *feasibility* of reducing environmental impacts.

5.4.1.2 Applying community-based social marketing

CBSM, as a behaviour-change strategy, captured attention, helped transfer knowledge and evoke behaviour change. Commitment was emphasized via the post-questionnaire and interviews. Of course, with time forgetting may act as a significant barrier. Thus, materials were passed out, including 'prompting' stickers to re-enforce the message. General findings, as discussed reflected positive student commentary regarding this interactive approach.

---

[106] Global environmental challenges and consequences were depicted, but simple and localized actions that students could easily do were suggested as applicable solutions for young persons.

5.4.1.3 Applying Empowerment Evaluation

Many students admitted to having heard some of the information provided, but often felt *overwhelmed* by what to do or how to go about creating change (Student interview Katedralskolan, 2007, personal communication). Empowerment evaluation was thus supportive in helping students *get involved* in the discussion, making them feel *empowered themselves* and provoking self-reflection. Such a technique demonstrated that students *can* make a change in their behaviour by providing encouraging examples. Final analysis and comments demonstrate many students felt they *could* make a difference via their behaviour.

5.4.2 Positive commentary about the educational tool

Overall, students appeared to have a positive assessment of the exercise and piloted study. Information appeared to be interesting and relevant for youth choices and behaviour related to their activities. After the class given at Heleneholms Gymnasium, several students stated that it was one of the first presentations about environmental issues that held their attention (Student comment Heleneholms, 2007, personal communication). Another student in the same class wrote, *"The best seminar about the environment that I have heard."*[107]

Compared to just receiving environmental information, students stated that they preferred to be involved in an interactive format, receiving practical information. One student commented, *"Very good facts and tips,"* (Student comment Katedralskolan, 2007, personal communication). By stressing that student participation could influence the research findings and the piloted experiment for Malmö's Environmental Department; students were made to feel *involved* and their comments and answers valuable. When asked about what they will *do* with such information, about 70% stated that they will share some information with friends and family, thus confirming greater knowledge transfer (Student responses to questionnaires, all schools). Through written responses and comments received, it can be assumed that students prefer an interactive approach to empower behaviour changes, than campaigns that promote information alone.[108]

---

[107] No negative comments were received. Perhaps this was because students less interested simply opted not to respond at all. However, such an assessment can not be confirmed.

[108] However, as previously recognized, students and teachers considered information received in media and municipal campaigns to be an *indirect link* to consequent behaviour change (Student interview Heleneholms and Gruner-Viig, 2007, personal communication).

5.5 General Assessment

Amongst students, awareness was quite high, as was assumed. Their behaviour reflected some participation in environmental behaviour *already*, particularly in the area of preferred transport alternatives and recycling behaviour. According to students such behaviours are common practice in their schools and thus can be considered a social norm in these environments. This is partially due to availability of infrastructure, but also convenience; as demonstrated in Figure 5-3.

Figure 5-3: Images of school bike racks and practical advice regarding recycling materials attached to the container; both of these behaviours had high participation amongst students surveyed.

There was generally less previous environmental awareness of impacts of shopping and travel, and of the extensive array of environmental and energy impacts depending on our food choices. While some students mentioned environmental impacts pertaining to food transport or meat consumption, there was limited corresponding behaviour, at least prior to the presentation.

The post-survey and questionnaire revealed that about 25% of students stated that they will make some attempt to change behaviour related to food choices.[109] Regarding simple behaviour changes pertaining to energy, about 30% of students stated that they will reduce shower time, close the window while sleeping or be energy-conscious when cooking food. A few students made comments regarding reducing clothing consumption, shopping at second-hand stores or looking for organic alternatives for cotton clothing. Several students also stated they would opt for train instead of a plane or car while travelling in Sweden.

Overall, upon evaluation, it can be assumed that the knowledge transfer technique applied had some level of effectiveness. However as one student put it, when asked if the presentation would influence their corresponding behaviour: *"Yes, a little, at least in the beginning."* Thus, as rightly put, it may be difficult to see if resulting behaviour changes will maintain a long-term behaviour change.

---

[109] Answers included choosing local, in-seasoned or ecological alternatives and reducing meat consumption, or opting for chicken as an alternative of reduced impact.

6 Conclusions

Everything should be made as simple as possible, but not simpler.

-Albert Einstein

We live in an increasingly urban world and with urbanization come opportunities and access, but also concentrated challenges to resource consumption and management of waste and emissions. While it is often assumed that solving our urban environmental problems will only require the right technologies, before technological answers can provide solutions, people must *use* and incorporate these technologies in to their daily habits. Thus increasing participation and catalyzing behaviour change, particularly in concentrated urban environments, can make a significant contribution to reducing environmental impacts. The idea that the quantity and quality of the Earth's resources are *scarce* relative to *demand* is not a new concept. Nor is the notion that people should be involved in solutions for planning, implementation and management of their own communities and behaviour. Yet as attention to environmental dilemmas escalates, citizen involvement and participation has gained significant attention and value.

Citizen participation related to behaviour, as it is examined in this thesis, has been suggested as a means by which to increase urban sustainability through improved resource and energy efficiency, and *utilization* of technology and infrastructure. *Involving* the public in environmental resource planning is also a sound principle of demographic governance and can help increase public interest and curiosity in environment and energy agendas.

The case-study locations of Malmö and Lund demonstrate, via local policies and investments, a sincere attempt to involve the public and encourage participation in sustainable alternatives. However, as cities are dynamic and evolving, new programmes must be created to maintain curiosity, enthusiasm, re-confirm environmental norms and generate increased levels of participation in sustainable behaviour. Such was the nature of the educational-tool that was piloted during the thesis research.

Youth were the target of the thesis research, as they are an easily accessible group to contact and also can be vulnerable to societal pressures and consumption trends that may, or may not be, sustainable in nature. Furthermore, general beliefs and behaviour patterns are formed in child or adolescent years. Thus, this programme, geared towards knowledge transfer and behaviour empowerment, examined *current* levels of *environmental knowledge, participation in environmental behaviour,* and evaluated whether such a technique could be useful in influencing *increased participation* in environmental behaviour. General results indicated that *yes,* the educational tool employed *was effective* in helping students feel encouraged to make behaviour changes, at least in small and simple measures. A primary message addressed attempted to demonstrate the *simplicity* of creating small behaviour changes, as well as various techniques (i.e. prompts) to help students *remember* to take such actions.

6.1 Reflections on the analytical framework to support implementation of the educational-tool

The framework of *how* to implement a behaviour-change programme and *what* to include, in order to challenge barriers and encourage environmental behaviour was primarily influenced by the literature review. Different disciplines were considered including environmental

psychology and sociology, as well as urban planning and incorporating public participation. All assisted the research method to a greater or lesser degree. This was supported by in-person interviews and meetings with various professionals and employees at environmental departments in Lund and Malmö. Next, a tool to connect *knowledge transmission* with *behaviour change* was created via guidance of Malmö's Environmental Department.

Following the development of the educational tool, interviews were conducted with local teachers and various methods were used to analyze current student awareness, reaction and behaviour. Amongst these were written surveys, verbal interviews and observation of student interaction and infrastructural provision. Using multiple methods helped provide more concrete research findings; however upon completion of the analysis and final evaluation, perhaps a revised questionnaire may have proved useful. Additionally, implementing the activity at an earlier date may have allowed time to re-assess the effectiveness of such a tool. However, logistical constraints prohibited this opportunity and thus a one type visit proved sufficient.

6.2 Principal findings

Primary influences to behaviour discussed in the literature review include awareness, community identity (i.e. social capital), norms and values, experience, infrastructure, attitudes, perception of immediateness and incentives to participation. As analyzed by the students' responses, major influences to *their* behaviour can be loosely broken into two categories: awareness (providing a *theoretical* understanding of the problem) and infrastructure (facilitating *practical* solutions to incorporate behaviour); as listed in Figure 6-1. High behaviour can also, *in theory*, extend environmental awareness and facilitate infrastructure growth, via public support to technological investments and policies geared towards sustainability.
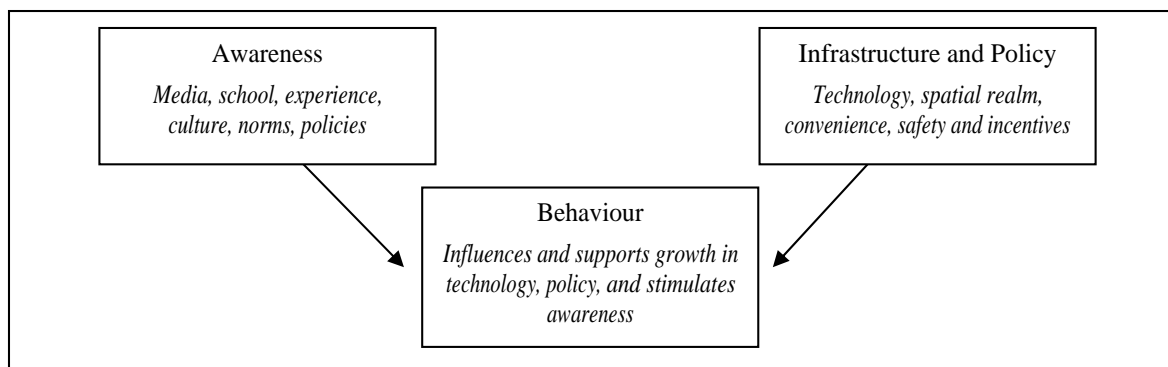
Figure 6-1: Primary influences to participation in various behaviours[110]

However, while infrastructure and attitudes support some behaviours, as in source separation and transportation, this was not the case in other behaviours. Each activity and behaviour encompasses its own opportunities and barriers. Common barriers for students include: *laziness, time, inconvenience, media overload, forgetting, a lack of perceived alternatives* or *a sense of hopelessness*. Other barriers, generally case-specific, can also be important to an activity, a location or even a culture. This includes barriers related to weather patterns, culture and

---

[110] Infrastructure is loosely defined as the external environmental conditions which support and facilitate behaviour. Thus, non-monetary incentives fall into this category.

seasons. For example: when asked, many students admitted to leaving a light on in an empty room to maintain an inviting impression or leaving the window open *slightly* during winter months to receive fresh air.

A surprising barrier to behaviour mentioned by a student was, *in fact*, the present level of available technology and the perception of a sustainable energy mix. This student commented, *"Our energy already comes from sustainable sources, such as hydropower, that do not pollute the environment as much…so we do not need to adapt our behaviour…"* This student thus, rightly or wrongly, had a high confidence in technology's ability to alleviate environmental burdens, and was less convinced about behaviour changes.[111] However, as every decision we make carries some environmental impact, *reducing* our consumption should remain a top priority. Such a comment, as from this student, reemphasises the need to instil proper communication to the public, emphasizing environmental behaviour, particularly when it comes to what is presumed as *sustainable* alternatives.

Results indicated that the information for students was relevant, interesting and applicable. Students commented that they *preferred* an interactive classroom model which gave them an *applicable* connection to environmental behaviour, as opposed to a more *theoretical* approach, which may appear distant to everyday activities. Thus, continuing such a live-interaction, as done in this case study, or in other projects including Malmö's Klimat-X, is recommended.

Interactive *'live'* approaches prove relevant for many reasons:

- It provided *tangible* access to information;

- Students can *visibly* and *physically* be involved and shape the outcome of the activity or workshop;

- It provides an opportunity for *self-reflection* and potentially a *re-evaluate* personal activities;

- A physical person can *testify* and *demonstrate feasibility* of incorporating activities and act as a model for acceptance of sustainable behaviours.[112]

6.3 Recommendations

The thesis period provided an opportunity to employ a potential strategy for behaviour change; although the time period was short and thus extensive analysis could not be made during the research period. However, based on the strategy utilized, the following recommendations are made for further research or implementation of an extended behaviour-change programme catered to youth or another target group.

6.3.1 Cater the programme to the specified target group

Focusing on common activates of a target group, (i.e. hamburger consumption and shopping for the target group) and providing impacts and advice specific of *those activities* proved useful

---

[111] Other students, on a similar line, admitted to purchasing energy-efficient light bulbs and upon doing so, *forgetting* or *opting not* to turn them off. In these cases, technology can have a negative impact regarding corresponding behaviour.

[112] This is similar to the block-leader approach referred to in the literature.

and can be recommended. Student comments include, *"I will try to eat at Burger King less often,"* and *"I will try to buy less clothing, or look for second hand stores."*

However, findings also indicated that varying responses were received in the different classes. To effectively define the underlying barriers to behaviour, it is recommended that students be examined as both *a single target group* (i.e. young persons), but further as *various target groups*, depending on demographic factors, educational studies and interest backgrounds. For example, perhaps a more *practical* and *applied* demonstration of the feasibility to implement behavioural change and how to physically do so may have been interesting and relevant for the vocational-students (as an example).

6.3.2 Indicate generational changes when communicating with youth

Most students considered their *present* activities and behaviour *sustainable*; perhaps because they have grown up in a time shaped by a society with ample access to goods, technology and opportunities that previous generations did not possess. The societal benefits to this are of course obvious. However, the patterns of behaviour that young persons are learning reflect a certain level of ignorance regarding the consequences of such consumption. For environmental campaigns to achieve some sort of leverage in shaping behaviour they must identify the generational differences as a ground for comparison to challenge perception; for instance, pointing out to youth the *invisibility* of energy consumption and to challenge engrained behaviour which perceives *affluence* and *abundance* as the status quo.

6.3.3 Further collaborate with teachers or community leaders

All the classrooms visited had teachers that were supportive and enthusiastic about the research project. Furthermore, according to some, it gave *real-life examples* regarding some of the subjects they are teaching, making education and learning *alive* and *relevant* for students. Such a perspective was beneficial two-fold. First, teachers were supportive to the study by providing classroom time for the thesis research, and second they asked for various reports and data to share for future classes. (This included a copy of the presentation, as well as various reports used to support findings.) This can potentially catalyze knowledge transfer in other classrooms or amongst other teachers. Thus, not only are classroom settings an easy access group, as they are in the business of learning and spreading knowledge, they provide an environment eager to spread tangible and practical information.

6.3.4 Extended time to test effectiveness

One of the greatest limitations to the thesis research was a *lack of time* to be able to go *back*, *reemphasize* the information and *test* to see if such a technique will have a long-term impact. Some teachers stated that they may have time to conduct a second analysis after a month, but this will fall *after* the thesis research is completed. Therefore, as a recommendation to the pilot-study for Malmö's Environmental Department and before final implementation, behaviour-related programmes should be analyzed several times. This will both provide more insightful results as to the effectiveness, but also help *prompt* student behaviour according to what they have learned.

6.3.5 Support Groups

If such a programme were to be implemented over an extended period of time, one strategy to recommend may be to utilize *support groups* centered on employing sustainable behaviour. Support groups amongst fellow students, or including teachers can engage and activate environmental norms and group commitments. Students in a classroom setting (or another target group) could gather for a brief period on a regular basis and discuss various environmental behaviours they are partaking in or barriers to behaviour they have encountered. As research has shown, one of the greatest influences on our behaviour is, *ourselves*. Stimulating an environment to discuss environmental behaviours can help build camaraderie amongst each other (utilizing social capital), evoke group or personal commitments, induce self-reflection and provide practical suggestions (via support of our peers) for implementing improved patterns of behaviour. Such a format could catalyze participation as described in Figure 6-2. Once people realize that barriers are actually quite low to many behaviours, it may encourage incorporation of other environmental behaviours; even if case-specific barriers to other barriers exist.
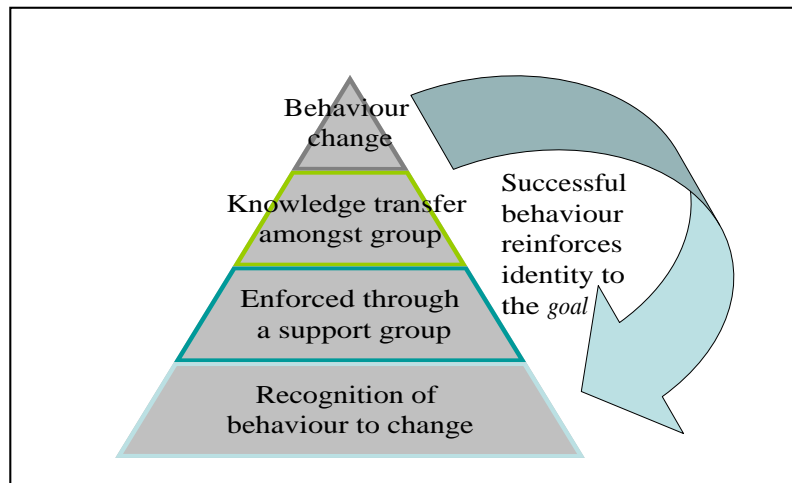
Figure 6-2: Support groups can help support and re-confirm behaviour change

6.4 Final thoughts and interests for further research

This research primarily focused on what *influences participatory behaviour* and how to increase levels of civic participation in environmental behaviour to increase urban sustainability. However as noted in the findings two of the primary factors considered, as emphasized by students and researchers, are the role of *infrastructure* and *social capital*. A primary interest for the thesis author is the underlying role and influence of the spatial environment to facilitate feasible and convenient participation in sustainable behaviour, generate social capital and aesthetic attachment, and ensure public support of infrastructural investments. While this was not the focus of the current thesis, the influence of the spatial environment is an interesting and significant feature influencing both the ability and the motive to participate in environmental behaviour. Any programme attempting to boost participation in sustainable behaviour should consider this critical component.

Bibliography

Agyeman, Julian and Angus, Briony. (2003). The role of civic environmentalism in the pursuit of sustainable communities. *Journal of Environmental Planning and Management*, 46, 345-363.

Alberts, Daniel, J. (2007). Stakeholders or subject matter experts, who should be consulted? *Energy Policy*, 35, 2336-2346.

Bell, Paul, A., Green, Thomas C., Fisher, Jeffery D. and Baum, Andrew. (1996). *Environmental psychology: Fourth edition.* Fort Worth, Texas: Harcourt Brace College Publishers.

Burn, S. M. (1991). Social psychology and the stimulation of recycling behaviours: The block leader approach. *Journal of applied social psycholog*y, 21, 611-629.

Bäckstrand, Karin. (2003). Civic science for sustainability: Reframing the role of experts, policy-makers and citizens in environmental governance. *Global environmental politics, 3,* 24-40.

Carlsson-Kanyama, Annika, Linden, Anna-Lisa and Eriksson, Björn. (2004). *Hushållskunder på elmarknaden: Värderingar och beteenden.* [Household customers in the electricity market: Evaluation and behaviour.] Lund: Department of Psychology.

Center for Public Space Research. (2003). *Public space: Public life*. Copenhagen: Center for Public Space Research, School of Architecture, The Royal Danish Academy of Fine Arts.

Cialdini, R. B., Reno, R. R., Kallgren, C. A. (1990). A focus theory of normative conduct: Recycling the concept of norms to reduce littering in public places. *Journal of personality and social psychology*, 58, 1015-1026.

Cialdini, R.B. (1993). *Influences: Science and practice*. New York: Harper Collins College Publishers.

Corbett, Judy and Corbett, Michael. (2000). *Designing sustainable communities: Learning from village homes.* Washington DC: Island Press.

Donaldson, Steward, I. and Scriven, Michael. (2003). *Evaluating social programs and problems: Visions for the new millennium.* London: Lawrence Erlbaum Associates, Publishers.

Hanna, Susan, Folke, Carl and Mäler, Karl-Göran. (1996). *Rights to nature: Ecological, economic, cultural and political principles of institutions for the environment.* Washington DC: Island Press.

Eisenhauer, Brian, W. and Nicholason, Brian. (2005). Using stakeholders' views: A social science methodology for the inclusive design of environmental communications. *Applied environmental education and communication, 4,* 19-30.

Evans, Bob, Joas, Marko, Sundback, Susan, Theobald, Kate. (2004). *Governing sustainable cities.* London: Earthscan Publications Ltd.

Fenech, Margot. (2002). *Understanding public participation in source separation of waste: Implications for the implementation of waste management policies with particular focus on Malta and Sweden.* Lund University: The International Institute of Industrial and Environmental Economics.

Fetterman, David, M. (2001). *Foundations of empowerment evaluation.* Thousand Oaks, California: Sage Publications, Inc.

Freeman, J. L. and Fraser, S. C. (1966). Compliance without pressure: The foot-in-the-door technique. *Journal of personality and social psychology, 4,* 195-202.

Gehl, Jan. (2001). *Life between buildings: Using public space.* Copenhagen: The Danish Architectural Press.

Gehl, Jan; Gemzoe, Lars; Kirknaes, Sia and Sondergaard, Britt-Sternhagen. (2006). *New City Life.* Copenhagen: The Danish Architectural Press.

Graham, Trevor. (2002). *Echoes of tomorrow*: *Ekostaden Augustenborg*. Malmö: City Publications.

Hesselgren, Sven. (1975). *Man's perception of the manmade environment.* Lund, Sweden: Studentlitteratur AB.

Harrison, Carolyn, M., Burgess, Jacquelin, and Filius, Petra. (1996). Rationalizing environmental responsibilities: A comparison of lay publics in the UK and the Netherlands. *Global environmental change, 6*, 215-234.

Herbert, David, T. and Thomas, Colin, J. (1997). *Cities in space: City as place*. London: David Fulton Publishers.

Ingebritsen, Christine. (2005). *Scandinavia in World Politics*. Maryland: Rowman and Littlefield.

Jaegar, C.C., Kasemir, B., Stoll-Kleemann, S., Schibli, D. and Dahinden, U. (2000). Climate change and the voice of the public. *Integrated assessment, 1,* 339- 349.

James, Sarah. (2002). Eco-cities, the next Swedish export: Across-the board sustainability is a way of life for a growing number of Sweden's cities and towns. *Planning*, 68 (5), 28-30.

Jayne, Mark. (2006). *Cities and consumption.* London: Routledge Tayler and Francis Group.

Kaiser, Florian, G. and Shimoda, Todd, A. (1999). Responsibility as a predictor of ecological behaviour. *Journal of environmental psychology, 19,* 243-253.

Kollin, Cheryl. (2003). The face of the future: the US and Sweden share the same goals for the environment. We can learn from each other's means of getting there. *American Forest*, 108 (4), 7-11.

Kollmus, Anja and Agyeman, Julian. (2002). Mind the gap: Why do people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental education research, 8,* 239-260.

Landry, Charles. (2000). *The creative city*. London: Earthscan Publications Ltd.

Loring, Joyce, McLaren. (2007). Wind energy planning in England, Wales and Denmark: Factors influencing project success. *Energy policy*, 3, 2648-2660.

Lund, Henrik. (2000). Choice awareness: The development of technological and institutional choice in the public debate of Danish energy planning. *Journal of environmental policy and planning*, *2*, 249-259.

Lund Miljöstrategiska enheten. [Lund Environmental Strategy Unit]. (2006*). LundaEko: Ett Agenda 21-dokument* [LundaEko- An Agenda 21 document]. Lund: City Publications.

Lunds renhållningsverk. [Lund's Refuge Collection Agency]. (2006). *Lunds renhållningsverk- Årsberättelse*. [Lund Refuge Collection Agency's Annual Report]. 2005. Lund: City Publications.

Malmö Ekostaden. (2004). *Västra Hamnen, the Bo01-area: A city for people and the environment*. Malmö: City Publications.

Malmö stad. (2002). *Agenda 21 i Malmö- från Rio till Framtiden*. [Agenda 21- From Rio to the future]. Malmö: City Publications.

Malmö stad. (2003*). Miljöprogram för Malmö stad 2003-2008- Plattform för ekologiskt hållbar utvekling*. [Environmental programme for Malmö city 2003-2008: Platform for ecological sustainable development]. Malmö: City Publications.

Malmö stad. (2006a). *Klimat-X: Succéför experimentverkstan*. [Climate-X: Success for the experiment workshop]. Malmö: City Publications.

Malmö stad. (2006b). *SECURE Intelligent Energy: We are making sustainable energy tomorrow's standard*. Malmö: City Publications.

May, Tim. (1997). *Social research: Issues, methods and processes*. Buckingham, UK: Open University Press.

McKenzie-Mohr, Doug and Smith, William. (1999) *Fostering sustainable behaviour: An introduction to community-based social marketing.* Gabriola Island B.C., Canada: New Society Publishers.

Milfont, Taciano, L. and Duckitt, John. (2004). The structure of environmental attitudes: A first- and second-order confirmatory factor analysis. *Journal of environmental psychology, 24*, 289-303.

Nyborg, Karin. (2003). The impact of public policy on social and moral norms: Some examples. *Journal of consumer policy, 26,* 259-277.

O'Neill, G, W., Blanck, L. S., and Joyner, M. A. (1980). The use of stimulus control over littering in a natural setting. *Journal of applied behaviour analysis*, 13, 379-381.

Pallak, M.S., Cook, D. A., Sullivan, J. J., (1980). Commitment and energy conservation. In L. Bickman (Ed.), *Applied social psychology annual*. Beverly Hills, CA: Sage.

Polatidis, Heracles and Haralambopoulos, Dias, A. (2007). Renewable energy systems: A societal and technological platform. *Renewable energy, 32,* 329-341.

Pooley, Julie Ann and O'Connor, Moira. (2000). Environmental education and attitudes: Emotions and beliefs are what is needed. *Environment and behaviour 32,* 711-723.

Porteous, J. Douglas. (1996). Environmental *aesthetics: Ideas, politics and planning.* London: Routledge.

Pruneau, Diane; Doyon, André; Langis, Joanne; Vasseur, Liette; Martin, Gilles; Ouellet, Eileen and Boudreau, Gaston. (2006). The process of change experimented b teachers and students when voluntarily trying environmental behaviours. *Applied environmental education and communication, 5*, 33-40.

Ringman, Mikael. (2007). Grönt ljus för stadsbussar. [Green light for city buses]. *Grön stad, 1*, 5. [Green City].

Rolfsdotter-Jansson, Catarina. (2006). *Eko/Fairtrade-guide Malmö.* Malmö: Malmö stad and Naturskyddsföreningen i Malmö. [Malmö city publications with Swedish Nature Society in Malmö].

Rossi, Peter, H., Freeman, Howard, E., Lipsey, Mark, W. (1999) *Evaluation: A systematic approach.* 6 ed. Thousand Oaks, California: Sage Publications, Inc.

Satterthwaite, David. (1999). *The Earthscan reader in sustainable cities.* London: Earthscan Publications Ltd.

Schwartz, S. H. (1977). Normative influences on altruism. *Advances in experimental social psychology*, 10, 221-279.

Schwarzwald, J., Ray, M., and Zvibel, M. (1979). The efficacy of the door-in-the-face technique when established behavioural customs exist. *Journal of applied social psychology*, 9, 576- 586.

Selman, Paul. (1996). *Local sustainability: Managing and planning ecologically sound places.* New York: St. Martin's Press.

Selman, Paul. (2001). Social capital, sustainability and environmental planning. *Planning Theory and Practice, 2,* 13-30.

Siero, Frans, W., Bakker, Arnold, B., Dekker, Gerda, B. and Van den Burg, Marcel T.C. (1996). Changing organizational energy consumption behaviour through comparative feedback. *Journal of environmental psychology, 16,* 234-246.

Stern, Paul, C. (1999). Information, incentives and proenvironmental consumer behavior. *Journal of consumer policy, 22,* 461-478.

Stern, P. S., Dietz, T. and Karlof, L. (1993). Values orientation, gender and environmental concern. *Environment and behaviour*, 25(3), 322-348.

Tanner, Carmen. (1999). Constraints on environmental behaviour. *Journal of environmental psychology, 19,* 145-157.

Thogersen, John. (1996). Recycling and morality. *Environment and Behavior, 29*, 618–637.

Turkle, Sherry. (2004). Whither Psychoanalysis in computer culture? *Psychoanalytic psychology, 21*, 16-30.

Vedung, Evert. (1997). *Public policy and program evaluation*. New Brunswick, New Jersey: Transaction Publishers.

Wates, Nick. (2000). *The community planning handbook: How people can shape their cities, towns and villages in any part of the world.* London: Earthscan Publications Ltd.

Wang, T. H., and Katzev, R.D. (1990). Group commitment and resource conservation: Two field experiments on promoting recycling. *Journal of applied social psychology*, 20, 265-275.

Windahl, Sven, Signitzer, Benno, and Olson, Jean, T. (1997). *Using communication theory: An introduction to planned communication.* London: Sage Publications.

Electronic Resources

European Academy of the Urban Environment, (EAUE). (2007). [Online]. Available: http://www.eaue.de/winuwd/default.htm. [2007, 7 May].

Lund Municipality (2007). Municipal environmental programmes. [Online]. http://lund.se/ [2007, April 27].

Perlman, J. E. (2000). Innovative Solutions Create Urban Sustainability. [Online]. Available: http://usinfo.state.gov/journals/itgic/0300/ijge/gj-04a.htm. [2007, 10 January].

United Nations Department of Economic and Social Affairs. (1992) Agenda 21. [Online]. Available: http://www.un.org/esa/sustdev/documents/agenda21/index.htm [2007, April 12].

United Nations Conference on Environment and Development (UNCED). (1992). Rio Declaration on Environment and Development. [Online]. Available: http://www.unep.org/Documents.Multilingual/Default.asp?DocumentID=78&ArticleID=11633 [2007, March 18].

United Nations Economic Commission for Europe, (UNECE). (1998). Convention on access to information, public participation in decision-making and access to justice in environmental matters. [Online]. Available: http://www.unece.org/env/pp/documents/cep43e.pdf [2007, March 18].

Personal Communications

Blomberg, Per. (Lund Municipality, Parks and Nature Office) (2006, 29 November). Personal communication for Strategic Environmental Development Course, fall 2006.

Birkedal, Linda. (LundaEko Coordinator, Lund Department of Environmental Strategy). (2006, 24 November). Personal communication for Strategic Environmental Development Course, fall 2006.

Ekenstierna, Magnus. (Biology teacher at Katedralskolan in Lund). (2007, April 23). Personal communication.

Gehl, Jan (Architect and Urban Designer of Gehl Architects, retired professor at the Center for Public Space Research, School of Architects, Royal Danish Academy of Fine Arts) (2007, 22 January). Personal communication.

Gronhölm, Raul. (SYSAV Utveckling AB, Project Leader) (2006, 8 December). Personal communication for Strategic Environmental Development Course, fall 2006.

Gruner-Viig, Jeanette. (Geography teacher at Heleneholms Gymnasium in Malmö). (2007, April 30). Personal communication.

Hagberg, Matz and Fontell, Kristine. (Housing and Energy Programmes, Lund Department of Environmental Strategy). (2006, 11 December). Personal communication for Strategic Environmental Development Course, fall 2006.

Knutsson, Conny and Lindström, Tommy (Vocational teachers in the electrician programme at Gymnasieskolan Vipan in Lund). (2007, April 25). Personal communication.

Kummel, Linda. (Secretary of Planning, Lund Department of City Planning) (2006, 12 December). Personal communication for Strategic Environmental Development Course, fall 2006.

Kuznitz, Deborah. (Programme Manager, Sustainable Seattle). (2007, March 30). Email communication.

Lindén, Anna-Lisa. (Professor in sociology at Lund University, specialization in factors influencing energy-consumption behaviour). (2007, May 9). Personal communication.

Nilsson, Daniel (Project planner in Environmental Strategy, Malmö's Environmental Department) (2007, 27 March and 11 April). Personal communication.

Norling, Malin. (Energy Advisor to Malmö's Environmental Department) (2007, 20 April). Personal communication.

Reepalu, Ilmar (Kommunstyrelsens ordförande or mayor of Malmö). (2006, October 11). Group discussion with visiting delegates from Seattle, USA. Discussion organized through *International Sustainable Solutions*, Seattle.

Student interviews (Gymnasieskolan Vipan in Lund). (2007, May 2). Group communication.

Student interviews (Heleneholms Gymnasium in Malmö). (2007, April 30). Group communication.

Student interviews (Katedralskolan in Lund). (2007, April 27). Group communication.

Wallström, Margot (Vice President, European Commission) (2006, November 23). Introductory speech held at a seminar in Malmö entitled, *How to build sustainable cities*.

Wiberg, Krister (Architect, retired professor in architecture at Lund Technical University, specialization in ecological and energy-efficient building and urban planning). (2006, November 28). Personal communication for Strategic Environmental Development Course, fall 2006.

Wiberg, Krister (Architect, retired professor in architecture at Lund Technical University, specialization in ecological and energy-efficient building and urban planning). (2007, March 29). Personal communication.

Zinkernagel, Roland (Project Coordinator in Malmö's Environmental Department). (2007, 27 March). Personal communication.

Additional Bibliography for the interactive tool pertaining to environmental choice alternatives

Brower, Michael and Leon, Warren. (1999). *The consumer's guide to effective environmental choices: Practical advice from the union of concerned scientists.* New York: Three Rivers Press.

European Commission Joint Research Centre. (2006). *Environmental impact of products (EIPRO): Analysis of the lifecycle environmental impacts related to the final consumption of EU-25.* European Commission Reports.

European Environmental Agency. (2005) *Household consumption and the environment.* Copenhagen: European Environmental Agency.

Generation Earth. (No Date). *Choose to Reuse: How to survey waste on your campus.* Los Angeles: Department of Public Works.

Monbiot, George. (2006). *Heat: How to stop the planet burning.* London: Penguin Books, Ltd.

Ryan, John, C. and Durning, Alan, T. (1997) *Stuff: The secret lives of everyday things.* Seattle, WA, USA: Northwest Environmental Watch.

UNESCO Division for the promotion of quality education and UNEP Division of Technology, Industry and Economics. (2002*). Youth X-change: Training kit on responsible consumption- THE GUIDE.* Paris: UNESCO-UNEP.

World Wildlife Fund, (WWF) and Swedish International Development Agency (SIDA). (2007). *Våra ekologiska fotavtryck: Information om människans påverkan på vår miljö.* [Our ecological footprint: Information on man's impact on our environment]. Stockholm: WWF Sweden.

Electronic Resources for the interactive tool pertaining to environmental choice alternatives

Aftonbladet (Daily Newspaper in Sweden). (2007). Klimat Hotet- är du klimatsmart? (Climate threat- are you climate smart?) [Online]. http://aftonbladet.se/klimathotet/flash/default.htm [2007, April 2].

Naturvårdsverket (Swedish Department of Environment). (2007). Det här kan du göra själv [This you can do yourself]. [Online]. http://naturvardsverket.se/sv/Klimat-i-forandring/Minska-utslappen/Det-har-kan-du-gora-sjalv/ [2007, March 30].

Swedish Nature Society (SNF). (2007) Swedish Nature Society. [Online]. http://www.snf.se/. [2007, March 30].

World Wildlife Fund (WWF) and Center for New American Dream (NAD). (2003). Live different: Why do you buy the items you do? Buy different: Changing a few small things in your life can make a huge difference. [Online]. Available: http://www.ibuydifferent.org/. [2007, April 8].

Appendix 1: Student Pre- and Post-Survey in English and Swedish[113]

<mark>**Before**</mark> the Presentation: What did you already know (or do)?

Daily Activities	How do the choices **you** make at various stages of an average day impact the environment or contribute to emissions?	Are you aware of specific actions as to how **you** can reduce **your** impact?	What specifically are **you** doing to reduce **your** environmental impact?
Wake Up (What happened *while you slept*)			
Getting Ready (Take a shower)			
Transport			
Daily Activity (School)			
Food Choices			
Past-time Activity			
House-work			

<mark>**If you need more space to write, please feel free to continue to write more (e.g. back of this paper, other sheets of paper).**</mark>

---

[113] (Modified versions of questionnaire to incorporate space availability in the thesis template)

After the presentation: What have you learned?

Daily Activities	How do the choices you make at various stages of an average day impact the environment or contribute to emissions?	Are you aware of specific actions as to how **you** can reduce **your impact?**	What specifically do you do to reduce **your environmental impact**?
Wake Up (What happened *while you slept*)			
Getting Ready (Take a shower)			
Transport			
Daily Activity (School)			
Food Choices			
Past-time Activity			
House-work			

If you need more space to write, please feel free to continue to write more (e.g. back of this paper, other sheets of paper).

<mark>Före</mark> presentationen: Vad visste du (eller gjorde)?

Dagliga aktiviteter	Hur påverkar dina dagliga val miljön, till exempel utsläpp?	Vilka insatser skulle du kunna göra för att minska din påverkan på miljön?	Vilka insatser gör du i dagsläget för att minska din påverkan på miljön?
Vakna (Vad hände medan du sov)			
Morgon tvätt			
Transport			
Dagliga aktiviteter (skola)			
Val av mat			
Fritid			
Hushålls-arbete			

<mark>Om du behöver skriva mer kan du fortsätta på ett annat papper som du bifogar.</mark>

Efter presentationen: Vad har du lärt dig?

Dagliga aktiviteter	Hur påverkar dina dagliga val miljön, till exempel utsläpp? (Vad har du lärt dig?)	Vilka insatser skulle du **nu** kunna göra för att minska din påverkan på miljön?	Vilka insatser kommer du att göra hädanefter för att minska din påverkan på miljön?
Vakna (Vad hände medan du sov)			
Morgon tvätt			
Transport			
Dagliga aktiviteter (skola)			
Val av mat			
Fritid			
Hushålls-arbete			

Om du behöver skriva mer kan du fortsätta på ett annat papper som du bifogar.

Jennifer Lenhart, MESPOM, Lund University

Appendix 2: Post-Questionnaire for students in English and Swedish

1. Will such information/advice influence your behaviour, and if so, *how*?

2. What specific behaviour -change choices or *environmental actions* will **you** commit to?

3. What will you *commit to do* with this information? (you can select more than one)
    a. Share it with friends or family
    b. Change your own life
    c. Find out more
    d. Nothing
    e. Others (please specify)

4. Do you feel a sense of responsibility to the environment regarding your behaviour choices and do you feel that *YOU* can make a difference?
    a. Yes
    b. No
    c. Not sure
    d. Others (please specify)

Swedish Version of Post-Questionnaire

1. Kommer denna information att *påverka ditt beteende* och i så fall *hur* ?

2. Vilka specifika beteenden kan du tänka dig att förandra?

3. Vad kommer du att göra med denna informationen? (Du kan välja fler än ett alternativ.)
    a. Dela med dig till vänner och familj
    b. Förändra ditt beteende
    c. Ta reda på mer
    d. Ingenting
    e. Annat (V.G. specifiera)

4. Känner du ansvar för miljön med avseende på ditt beteende? Känner du att **DU** kan göra en förändring?
    a. Ja
    b. Nej
    c. Vet ej
    d. Annat (V.G. specifiera)

Appendix 3: Interactive environmental communication tool presented to students

The interactive tool was presented via a PowerPoint and accompanied by interactive discussion with students. Various animation schemes were utilized in order to choose between the different choices regarding more (or less) environmentally-friendly choices. As it is difficult to fully clarify this ordering system in the appendix (without animation), the slides will be presented in the following order, divided into 3 sections. There are 66 slides, and they are ordered from left to right.

Also, as a disclaimer, the justification for all the information presented (or the full amount which may seem quite extensive) may not make sense without the class discussion to accompany it. Various slides were adopted, or removed, from different class settings depending on their interest level or background information.

The slide order is as follows:

1. **Master presentation** (18 slides)

   - (i.e. main slides including the introduction and the various questions related to behaviour choices)

2. **Option A(s)** (25 slides)

   - (This is the more environmentally-impacting option in daily choice. This includes the choices made in various daily stages: waking up, getting ready, taking a shower, etc.)

3. **Option B(s)** (23 slides)

   - (This is the less environmentally-impacting option which discusses tips with students as to how to reduce impacts at various stages in an average day)

Master Slides

(Part 1)

Sustainability in urban environments:

Linking knowledge and participation in sustainable behaviour

Jenni Lenhart
Thesis Research
April 2007

iiiee The International Institute for Industrial Environmental Economics at Lund University

---

What shapes our environmental behaviour?

- Awareness
  - School
  - Media
- Experience
  - Family
  - Personal
  - School
- Connection to community
  - Cultural Norms and Traditions
- Infrastructure
  - Convenience
- Incentives
- Locus of control (psychology)
- Perception of immediateness

Outline for the day

- Pre-quiz:
  - Choice and behaviour
- Presentation
  - Interaction and Choice
- Discussion afterwards
- Post-quiz
  - Additional questions
- Interviews

Behavioural choice and environmental alternatives

- Getting Ready
- Transportation
- School
- Food
- Free-time Activity
- Housework
- Prepare for sleep
  - (Impacts while you sleep)

What Can You Do?

The role of choice throughout **your** day

- How do your choices (with or without knowing) impact OUR planet?
- How much energy do you consume every day?
  - What are the related emissions?
- Are you aware (or practice) alternatives?

What is your ecological footprint?

- For everyone to live like an **average Swede**:
  4 planets

- USA:
  6 planets

Getting ready: Do you…

Option A:
- Take a *long hot* shower to wake up?
- Hairdryer?
- Leave water (especially warm water) running?
- Why does this matter?

Option B:
- Reduce shower time or temperature?
- 'Air dry' hair when it is warm outside?
- Why does this matter?

Transportation: Do you…

Option A:
- Drive to school often?
- Travel long distances by car?
- Drive alone?
- Own a large vehicle?
- Why does this matter?

Option B:
- Take public transport or bike?
- Try to 'eco-drive'?
- Combine activities in the same trip if you drive?
- Take other passengers?
- Why does this matter?

At School: Do you…

Option A:
- Leave lights on when no one is in a room?
  - What type of lights?
- Leave appliances on if not in use?
  - Or in standby at end of day?
- Print excessively?
  - One-sided?
  - Write on one-side of paper?
- Why does this matter?

Option B:
- Turn lights off when no one is in a room or during daylight?
  - Use CFLs if applicable?
- Turn machines off at end of day?
- Use recycled paper?
- Recycle materials in the office or school?
- Why does this matter?

Food Choices: Do you…

Option A:
- Eat lots of meat or dairy?
- Eat exotic foods?
- Boil too much water for tea?
- Use appliances inefficiently?
- Buy food with lots of packaging?
- Eat out often?
- Order more than you eat?
  - Throw food away?
- Why does this matter?

Option B:
- Reduce your meat intake?
- Consume local, *KRAV* or *rättvisemärkt* alternatives?
- Energy efficient cooking?
- Cook the right amount of food or share with friends?
  - 'Save for leftovers'?
- Buy food with less packaging?
- Avoid 'fast foods'?
- Eat *greens* in season?
- Eat to satisfy yourself?
- Why does this matter?

Free time: Do you…

Option A:
- Enjoy shopping?
  - For clothes or items?
- Drive to all activities?
- Enjoy traveling by plane on breaks?
- Watch TV?
  - Leave many appliances on at the same time?
- Why does this matter?

Option B:
- Enjoy time with friends and family?
  - Go to cinema?
- Spend time in nature or a park?
- Enjoy gardening?
- When shopping, choose better environmental alternatives?
- Why does this matter?

Housework: Do you…

Option A:
- Wash clothes with less than a full load?
  - High temperature?
- Dry clothes completely with an electric dryer?
- Throw waste because it takes too much time to sort and recycle?
- Why does this matter?

Option B:
- Only wash clothes on a full load or they are really dirty?
  - Shorter time?
  - Lower temperature?
- Partially or fully air dry?
- Recycle waste?
- Why does this matter?

Before you sleep: check for…

Option A:
- Standby equipment plugged in?
- Thermostat on high?
- Thin Blankets?
- Window left open when it's cold out?
- Why does this matter?

Option B:
- Standby devices unplugged?
- Thermostat lowered?
- Extra blanket?
- If you are cold, do you wear extra clothes?
- Windows closed if it's cold?
- Why does this matter?

Growing consumption trends and our planet

- Impacts of consumption:
  - Air pollution
  - Global Warming
  - Habitat Alteration
  - Water Pollution
- Availability and Accessibility
  - Rising purchasing power
  - Travel
  - Convenience
- Marketing and Advertising
- Increased Packaging
  - Increased Waste
- Lack of *connection*
  - Difficult to **see** the bigger picture
  - Individualization and sense of 'independence'

What can you do?

If you rely on others to do something, those others are probably relying on you too…

- Open your eyes…
  - Get informed, get moving
  - Use your creativity
- Collaborate and take action
  - Build environmental norms in your school or community
  - Build a collective voice
  - Engage the media
- Build commitment to the environment in your community or school

It's our future and it's in our hands

Make your voices heard

You can make a difference in your school and community

- A group of high school students in Santa Cruz, California organized and made plans on tips to save their school energy

- Suggestions saved significant energy and more than 24 000 USD
  - (162 000 SEK)

Discussion:

- Will such information influence your behaviour?
- What is most effective in influencing your behaviour?
  - Experience?
  - Norms?
  - Family?
  - Infrastructure?
- How to build passion?

Option A:
Higher environmental impacts

(Part 2)

Getting ready: Warm water

- 15 minute hot shower: 321- 1081 kilograms of CO2 annually
  - A shower longer than 12 minutes, same water consumption as a bath
  - 500 kilograms CO2: about a return trip to Paris
- Variation depends upon type of shower and home's energy mix

- Warm water unused, but left running: unnecessary emissions
  - Leaky faucets waste water and energy
- Average Swede: 66 liters of warm water daily

- Hairdryers: consumes 1000 watts and contributes to CO2 emissions
  - Avoid in summer months

Transport: Cars

- Transport: 20% EU environmental impacts
  - Emissions
  - Resource Depletion
  - Land uptake from roads and parking
  - Fragmentation of natural habitat

- 95% of energy to move car
- Cars: 4/5th of transport impacts
- Cars: 80% of transportation needs
  - Car Ownership in EU is increasing
  - Time and distance to destination increasing

- Malmö:
  - Car: 50% of all trips are by car
  - About 50% are below 5 kilometers
  - **Good news:** bus and train more frequent in Skåne

Impact categories

Transportation:	Carbon Dioxide Releases
Large Car	Releases 146-475 grams/kilometer CO2
Medium-Sized Car	Releases 110-350 grams/kilometer CO2
Small Car	Releases 81-216 grams/kilometer CO2
Environment Car	Releases 0-104 grams/kilometer CO2
Bus in the city	Releases 42 grams/person kilometer CO2
Bus on the highway	Releases 34 grams/person kilometer CO2

Energy consumption
at school

- Average office: 50% total energy for lighting (not always low-energy lights)
  - Computers: 35- 40%
- Standby in an office
  - Office in Skåne: 50% of energy consumption
- 600-watt photocopier:
  - Left on 24 hours: 5 000 SEK of electricity/ year
  - If turned on only during working hours, 2/3 of electricity saved
- How much paper is consumed?
  - Paper towels
  - Printouts
  - Books
  - Homework

Note:

- Food was considered a topic that students may have some awareness on, but less corresponding behaviour
- Thus it was emphasized in quite a few of the following slides.

91

Energy consumption in food preparation

- Refrigeration, cooking and cleaning: 7-12% of energy and emissions in household

- Often more energy efficient to use a microwave or eat foods raw
  - Depends on what you eat and for how many people
  - Oven: 45 minutes
  - Microwave: 7 minutes

Heating tea and coffee

- A pan uncovered results in lost energy:
  - Takes longer to boil
  - Energy is evaporated
  - Lid: 2x as fast and ½ cost
  - Kettle: ½ of the pan

- Heating more water than necessary wastes energy

Transport

- Food Miles
  - Distance traveled from field to plate
  - Food: 30% of transported goods
  - Transport emissions

- Changing systems
  - 1960s: average European grocery story had 2000 product lines
  - A modern supermarket has 15 000+
  - More food from father away

Impact of Beef

Cow (One cow: 500 burgers)
- Releases methane (CH4)

Grain (1 burger: cow eats 5x the grain)
- Grain: fossil fuels for planting, harvesting and transport
- Grains grown abroad and transported to cattle

Land (Converted to farmland for grain or grazing)
- 1/3 of land in world is used for raising livestock

Water (Equivalent to 11 bathtubs for 1 burger)

Soil (Erosion & deforestation: grazing & grain fields)

What does this mean?
With current food consumption, our planet loses a fertile area the size of Ireland every year from overgrazing and deforestation

Too much beef is bad for health

Impacts to Global Warming

Gas	From where?	GWP (global warming potential)
Carbon Dioxide	Fossil fuels, forest clearing, cement production	1
Methane	Digestive system of livestock, landfills, rice cultivation	21
Nitrous Oxide	Fossil fuel combustion, fertilizers, manure, air travel	310

Livestock emissions

Livestock: 18% of emissions (more than transport)

Enteric Fermentation (Process by which ruminant animals excrete methane via belching or passing gas)	86 million tonnes CH4/year (methane)
Animal Manure	18 million tonnes CH4/year
CO2 released from respiratory processes	3 billion tonnes CO2/year
Livestock related land-use change	2.4 billion tonnes CO2/year
Livestock induced desertification	100 million tonnes CO2/year
On farm fossil-fuel consumption (feeding, transporting live animals, providing electricity)	90 million tonnes CO2/year
Fossil fuels to make Nitrogen fertilizers for feed-crops	41 million tonnes CO2/ year
Rearing livestock	30 million tonnes CO2/year
Livestock related releases from cultivated soils	28 million tonnes CO2/year
Processing (transport, refrigeration of meat)	Several million tonnes CO2/year

Your car or your burger?

- 1.5 billion cattle and buffalo
  - Meat production expected to double: 2001 to 2050
- Switch to vegetarianism: shrink carbon footprint by 1,5 tons of CO2 a year
- *What does this mean?*
  Trading a standard car for a hybrid cuts only 1 ton

Food packaging

- 2/3 of package waste related to food
  - 'On the go' meals
  - 160 kilograms/person/year

Bottled water:
- Not safer or healthier than tap water
  - 1000 times the price
  - Fastest growing drink industry
- Plastic: 1,5 million tonnes to bottle
  - Chemicals: manufacture and disposal
- ¼ of 89 billion liters of bottled water worldwide are consumed outside country of origin
  - Transportation emissions

Food waste

- Up to ¼ of food is not eaten, but ends up as waste
- Due to:
  - Raw foods spoiled before consumption
  - Excess from meals
  - Un-purchased
  - Damaged during transport

Caution...
- Producing and transporting food (especially meat and dairy) requires energy and produces emissions, even if it not consumed

Did you know?

1 cup of coffee: 100 beans
  - 1/16th of berries on a coffee tree/year

Most coffee plantations clear-cut forests
  - Reduces tropical forests ability to absorb/sink CO2
  - Biodiversity reduction
  - After insect-eaters die, pests proliferate
  - Chemicals (petrol-based) applied, (emissions)

Next
  - Crusher (diesel-powered) removes beans from berries
  - Berry pulp discarded in rivers (methane)
  - Pulp decomposition consumes oxygen needed by fish

Beans: dried and transported in large quantities by freight ships and transport trucks
Repackaged and transported to grocery chains
Consumers purchase coffee and take home (car, bike or bus) and brew

Free time: Consumption, our new pastime...

- Over-consumption:
  our confusion to distinguish what we *want* versus what we actually *need*

- Retail in Sweden in 2006 for most durables (clothing, furniture) increased 11.8% from 2005

Did you know?
Cotton

- Accounts for 1/10 of world's pesticides
  - ¼ of insecticides
  - 5x before harvesting, a cotton field is spayed
  - Many harmful to health, (organophosphates), damage the central nervous system

- Cotton is one of most heavily irrigated crops
  - Grows in water-scare regions
  - 7 000 to 29 000 liters water/kilogram (Potatoes: 500 liters water /kilogram)
  - 162 000 liters of water/Swede for cotton alone

- T-shirt: 60 grams of cotton, 6 hectares of land

- Impossible to account all transport emissions and chemicals required because of its global nature

The Role of aviation

- Since 1990 aviation emissions increased 90%
- Aircraft produce 3% of EU CO2
  - Nitrogen oxides
  - Another greenhouse gas, ozone
- In a Swedish study, air transport ranked 8th in CO2 emissions amongst 51 product groups

Emissions of our travel

From:	To:	Fuel Used:	CO2 emissions
Malmö/ Copenhagen	Paris (return)	146 kilograms/ person	450 kilograms CO2/passenger
Malmö/ Copenhagen	New York (return)	467 kilograms/ person	1450 kilograms CO2/passenger
Malmö/ Copenhagen	Bangkok (return)	637 kilograms/ person	1980 kilograms CO2/passenger

What you can do:

Flying with SAS: offset your carbon emissions

SAS collaborates with *CarbonNeutral*

Daily chore: laundry

- Washing 1 machine/week: 10-20 kilograms of CO2/year
- Drying 1 load/week: 25-50 kilograms of CO2/year
- Significant energy to heat water and run machines
  - Washing and drying 1 t-shirt, 1 time demands 1/10th the energy as required to manufacture the T-shirt

Chores: Taking care of the trash

Accumulated waste:

Unsightly and bad for the environment

- Accumulated trash: harmful to animals
- *Recycling*: materials reused and reduces energy
  - Throwing or littering requires use of virgin resources
- Electronics, especially old TVs or computers with CRTs (Cathode Ray Tubes) contain heavy metals and hazardous waste
  - Should be handled at the appropriate recycling center
  - Metals: mercury, lead, phosphorous, cadmium, barium

Preparing for sleep: Standby consumption Energy vampires

- Average Swede: 46- 61 kg of CO2/person
- In Sweden: 1,4 TWh/year
  - Electricity of small power plant
- Most Homes:
  - Electricity consumption from standby: 5-15%

What does this mean?

UK: CO2 emissions from electrical equipment *on* standby equivalent to 1,4 million long flights

Where does it accumulate?

Standby Devices	CO2 Emissions
Stereos	1 600 000 tonnes
Videos	960 000 tonnes
TVs	480 000 tonnes
Consoles	390 000 tonnes
Cable Box, Digital TV	60 000- 100 000 tonnes
DVD players	100 000 tonnes

94

Sleeping temperature

- Heating : 70% of environmental impacts
- A home at 21+ degrees Celsius releases 640- 2015 kg of C02 annually into atmosphere
- Open window: heat escape
  - Additional expense
  - Leaking energy: 5-30% of energy

Option B: Reduced environmental impact
(Part 3)

Getting ready: Reducing impact

- Reducing shower time and temperature
  - 5 minute shower produces 360 kilograms CO2 annually
  - A reduction of more than 720 kg from 15 minute shower
- TIP: Install reminders or prompts to motivate your reduction

- Install a low-flow faucet (snålspolande) to reduce water consumption and energy from heating water
  - Up to 30% reduction in energy consumption and related costs

- Air-drying hair does not require energy or produce emissions

Transport: Reduce impact
- Bike: 0 C02 emission releases
  - 20 minute bike ride burns 210 calories
- Walk: 0 C02 emission releases
  - 600 calories for the same distance
- Train: .005 grams/person km CO2
- Bus: 34-42 grams/person km CO2
  - One busload of passengers: 40 cars off the road, saves 70 000 liters of fuel and avoids 175 tonnes of emissions a year
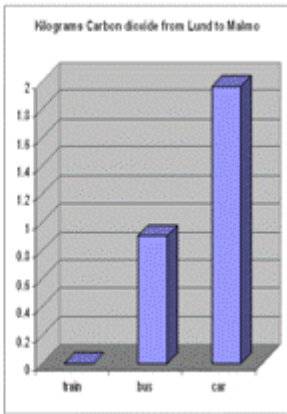
An easy choice...

How many kilograms of carbon dioxide are emitted on a journey from **Lund to Malmö**?

- Train: 0.000099
- Bus: 0.9
- Car: 1.96

Kilograms Carbon dioxide from Lund to Malmo

Other alternatives...

- Purchase an environmental car (bio-fuel or hybrid)
  - Or a smaller fuel-efficient vehicle
- Go to work, school in a carpool
  - Combine activities
- Learn to eco-drive
  - Save 15% on petrol costs and reduce CO2 by 15%

Reducing energy in the office or school

- Update with efficient equipment models
  - Flat-screen monitors: 1/2 as much manufacture waste and 1/3 the power
- Turn off monitors, standby and lights when not in use
  - Save 50% of energy in offices and schools
- Utilize Low-energy lights:
  - Use 80% less energy than incandescent lamps and last 6x longer
- Check for electronic label systems:
  - TCO ecolabel for electronics or EU energy label for electronics

Recycle
Buy recycled

- Recycling 1 tonne of paper:
  - Save 19 trees
  - 3 cubic meters of landfill
  - 4 000 kilowatt hours of energy
  - 29 000 liters of water
  - 30 kg of reduced air pollution
- Manufacturing recycled paper: 64% less energy than paper from new trees

Kitchen Conscious
Energy Consumption

- Water boiler: fastest and most efficient way to boil water
  - If you boil water often, more cost effective to purchase a water boiler
- Add only amount needed: reduce time and energy
  - Do you need water to completely boil?
- No water boiler?
  - Use a lid

Buy Local

- Buy local if possible
  - Support local, organic farmers
  - Reduce 'food miles' and transportation emissions
  - Choose local alternatives
- Buy KRAV or ekologisk
  - Reduce chemical dependancy
  - Petrol-based chemicals
    - Global warming
    - Damage animal habitat
    - Affect human health

Alternatives available

- *Större andel vegetabilier*
  Mindre utrymme för "tomma kalorier"
  Andelen ekologiskt ökas
  Rätt köttval, rätt grönsaksval
  Transportsnålt
- Instead of beef, chicken: 15 times less environmental damage/serving
- Meat-free diet: prevents 4000 square meters of trees destroyed per year
  - About half of a football field
- Myth Breaking: Eko-foods can be cost competitive
- Eat proper servings, not more
  - Better for you and environment

A better BBQ

- On the grill, try a vegetarian alternative
- Know labels:
  - Purchase FSC (Forest Service Council) coals from sustainable forests
  - Reduces deforestation
  - FSC: *responsibly managed*
  - Label on other forestry products

Know your seasons

- Avoid non-seasoned food from far-away or hot-houses
  - Greenhouses: extensive heat to grow plants (emissions)
  - Transported from warm climates: 'food miles'

- Food production and distribution: 22% of total emissions in EU

Avoid Packaging

- Choose items with less packaging
- Tell your grocery store:
  - For items with reduced packaging
  - 80% of products have a 15 minute useful life (packaging)

- Plastic Bags:
  - Fossil fuels as feedstock
  - Fossil fuels as production energy

- **Bring your own bag** and reuse
  - (0 emissions)

Coffee Alternative

- **Coffee:** world's 2nd largest legal export commodity (after oil)
- Purchase rättvisemärkt and KRAV coffee
  - Protects fragile habitats where coffee grows
  - Shade-grown coffee: grown in natural habitats
  - Chemical-free
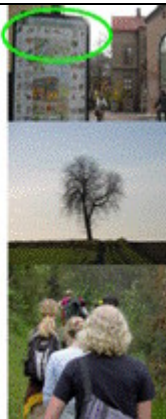 - Protects rights of coffee growers and pickers

Free time: Reduce your impact and still have fun

- Go to the theater
- Try out dancing lessons

- When you shop, look for options with organic cotton, or try out second hand-stores
  - Give clothes a second life
  - Support a local charity

Enjoy Nature

- Take *Naturbussen* to nearby nature areas in Skåne
  - A public option to open areas, as opposed to driving
- Enjoy fresh air and nature
  - Get exercise
  - Spend time with friends or family

Spend Time in Public Spaces

- City parks and public space provide a close alternative to enjoy outdoors
  - Read a book or spend time with friends
- Get to know your community and neighbors better
- Get involved in community activities and events
- Bike or walk there: 0 emissions

97

Plant Your Own Vegetable Garden
- Rent a 'colony lot'
- Grow your own food and reduce 'food miles'
- Cut chemical consumption from large-scale production
- *Tastes fresher*
- A good excuse to enjoy the sunshine

Chore: Reduced energy consumption in laundry
- Washing 1 machine load every week: 10-20 kilograms of CO_2/year
  - Be sure to wash a full load
- To reduce drying time, air dry
  - Partially dry clothes
  - Remove large items

Energy and Recycling
- Recycle 1 glass jar
  - Energy to light a 60 watt bulb for 4 hours
- Recycle cardboard
  - Cut sulfur dioxide emissions in half and save ¼ of manufacturing energy
- Recycle 1 aluminum can
  - Energy to light one 100 watt bulb for 20 hours or run a TV for 3 hours
- It takes 95% less energy to produce new aluminum from recycled cans
  - Pick up cans and recycle them
- Compost: improve soil, reduces waste

KNOW where standby energy lurks…

Product Category	Devices
TV and Video Equipment	TV, VCR, DVD, Cable box, Digital/satellite TV, Video game player
Audio	Compact audio system, Portable stereo, Personal stereo, additional speakers
Phone Equipment	Answering machine, Cordless phone, Mobile phone charger
Home Security	Doorbell, Smoke detector
Kitchen	Microwave oven
Personal Care	Electric toothbrush, Shaver
Office Equipment	Copier, Computer monitor, computer body, Laptop charger
Other	Battery chargers, dimmer switch on lights

Then get RID of it…
- Purchase a device to reduce standby
  - Controls many gadgets at once
  - Works with a 'censor'
  - (200-1000 SEK)
  - Or unplug
- Unplugging reduces 100%!
- *Take Action*: share tips with your family or friends
  - This lowers emissions more

Reducing heat
- Lower thermostat
  - Lower to 18 Celsius when sleeping
  - Reduces 550- 1725 kg of CO_2
  - 100- 300 kg of CO_2 reduction
  - Also: healthier for sleeping
- Use an extra blanket
- Wear a sweater or socks in winter months
- Close windows/blinds if cold outside
  - Reduce heat escape