Energy efficiency is EASY: new knowledge to change human behaviour

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Abstract
In 2003 the Ministry of Economic Affairs in the Netherlands ordered to develop a highly interactive but cost-effective communication instrument for energy efficiency based on new media. Recent experiences from the United States on the field of health care show great potential for computer tailoring. The internet system should be developed according to the latest scientific insights on the field of internet tailoring in order to communicate with consumers on a base of a personal circumstances.

In 2004 the technical development of the website was finished and tested among thousand households. The results indicated similar experiences as in the United States; a significant part of the website-users decided to switch over to energy efficient lighting. Estimations show that each household that implements this energy efficient lighting, generates an average energy reduction of about 18 kWh per year.

On the marketing side, the Ministry decided not to market the website through a network of 'trusted entities' for consumers. Targeted partners in this network are national institutions like the National Association of Owner-occupiers, the National Consumers' organisations, the National Institute for Budgetary Control, but also local authorities and housing institutions. The type of co operation is new: marketing by 'co branding. Each partner is allowed to promote the website as one's own The win-win effect guarantees a structural 'close to the consumer' exploitation on a base of shared costs. The actual situation (March 2005) is that beside the relevant national consumer institutions also local authorities and housing institutions already joined the network.

Introduction
Households are an important target group for energy reduction. The goal of the Dutch government for consumers is a reduction of energy use of 1,3% per year (Ministry of Economic Affairs, 2002). In order to achieve this goal, behavioural changes are necessary besides technological innovations. Changing behaviour is difficult because consumers form a diffuse target group. However, internet technology offers today the possibility to reach diffuse target groups, with tailored information.

Based upon American experiences on health issues (Kreuter and Brennan, 2001) and (scarcely available) Dutch research data there is rising confidence that computer tailoring can be an effective intervention strategies for energy efficient behaviour.

Through computer tailoring, information can be individualised and fitted to personal circumstances and motivations. Besides this, tailoring can provide a follow-up advice and feedback about the consequences of changing in behaviour (for example: reduced costs, less pollution etc.). In the third place, tailoring also creates possibilities for benchmarking with for example other households.

The use of computer tailored information methods has already proven their added value in for example American health services in bringing about behavioural change. It seems that there is a promising new technique to influence (energy related) consumer behaviour: tailor-made advice via internet.

Therefore, in 2003 the Ministry ordered to develop an instrument that combined the advantages of reach and energy efficiency-effect. An interactive internet system was developed that was really able to communicate and feed back with consumers on a base of consumers' individual circumstances, called *"Energy Advisor to Serve You" (EASY).*

This paper starts with a short theoretical look on changing energy related behaviour and interventions. Also the concept of computer tailoring for energy efficiency will be explained. In part three we will describe the results of the pilot-test of the system and finally the planned marketing-approach will further be explained.

Theoretical background: changing behaviour and interventions

In general, a distinction can be made between structural and psychological strategies for behaviour change (Abrahamse, Steg, 2002). Structural strategies are aimed at changing the circumstances in which choices are made and affect people's opportunities, via financial-economic instruments (e.g., rewards), legislation and enforcement or physical changes (e.g., environmental alterations, technological innovations, provision of facilities). Psychological strategies are aimed at changing people's knowledge, awareness, attitudes, norms, values and perceptions via information, education, communication and modelling (Gorts, Jonkers, 2002). Examples are information campaigns, prompts, goal setting, feedback and commitment. In this paper we focus on psychological strategies for behaviour change.

It is argued that consumers are prepared to change their behaviour if the consequences of the change are beneficial for the consumers themselves, if the type of desired change can be easily fitted into and adapted to the daily routine, if the desired change is not too difficult to implement, if the 'new' desired behaviour can be tried out first and finally if consumers receive positive feedback about the consequences of their behavioural change.

The importance of these conditions in realising behavioural change differs in many cases not only per specific target group, but often even per member of the group (e.g. per household). In general it can be said that the chance for individual behavioural change increases if specific interventions fit into the consumers' personal circumstances. American experience and research data aimed at behavioural change on health issues (Kreuter, Brennan, 2001) and Dutch research data on nutrition education (Brug,1999) indicate the potential effectiveness of this approach. So, when personal preferences and possibilities to structurally contribute to energy and environmental objectives are taken into account, then the chance that consumers will show (lasting) energy saving/energy friendly behaviour increases (Greer, 2000).

Concept of computer tailoring and communication

Computer-tailoring is more than digitising personal information (Jonkers, 2000). Personalisation is often carried out by addressing a text to a certain individual, in which his/her name is used several times. In tailoring the information is adapted to the individual motivational and behavioural aspects and circumstances in which the behaviour occurs. When producing tailored' information/education (distributed in any shape: in writing via CD-ROM, via internet, via telephone) at least several stages have to be passed through (Van Lieshout, Mulleman, 2000):

- an assessment is required of (the determining factors) of someone's energy related behaviour;
- 'a message library' is required which contains all the energy savings advice which may be needed;
- an 'algorithm', a set of decision rules, needs to be set up, in which the data from the assessment is evaluated and in which the advice that is in keeping with the specific wishes, needs and possibilities of the advise taker is selected;
- suitable canals are required to communicate this advice in an understandable, clear and attractive way to the person concerned. This could be done by way of a letter, but also for example via the internet.

In line with these steps, four disciplines (behaviour, energy, ICT and communication) are involved, briefly amplified below.

Behaviour

During the development of the internet instrument, an extensive behavioural research (N = 1 500) was held to investigate how energy behaviour can be permanently changed through a tailor-made advice system. The primary conclusions from the behavioural research are that there is ample interest for tailor-made energy advice among consumers and that there are many consumers say they know much about energy saving, but this is not in accordance with their actual knowledge (Jonkers, De weerdt, 2002).

The behavioural research also showed that consumers especially see opportunities in the field of low-energy apparatus like lighting, taking shorter showers, heating and washing and drying. The tailor-made advice system will have to focus on these energy saving options.

The starting point for the development of the internet system should therefore be the interest one has for the subject (e.g. financial benefits, environmental reasons). Furthermore, the system should focus on (eliminating) restrictions by providing tips how one can deal with these restrictions (e.g. the advice 'buy low-energy light bulbs' is translated into: 'where can I buy low-energy light bulbs?').

Also, consumers' awareness about their insufficient knowledge about the possibilities of energy saving will have to be raised (by benchmarking). Finally, consumers need to receive feedback about the positive effects of their measures (Valk, Westra, 2002).

Energy

For each appliance a distinction is made between the purchase-aspect on the one hand and the use of the product-aspect on the other hand. Within 'use', a distinction is made between the aspects frequency and intensity. These distinctions refer to different behaviour options. Then, for each

particular behaviour option the energy use has been calculated on a yearly basis.

The following energy functions and matching appliances are included in the internet system.

Table 1. Types of energy functions and appliances in EASY.

Function:	Appliance:
Cooling	Refrigerator
	Freezer
Food preparation	Coocking unit
	Dish washer
Clothing cleaning	Washing machine
	Dryer
Lighting	Light-bulbs
Climate control	Heating system

ICT

The highly complex technical development of EASY will not be described in this paper, because of it's high technical complexity. This would also go too far beyond the prime target: to address new knowledge in changing behaviour. But the poster presentation will contain several screen shots to illustrate the technical background of the internet system.

Communication: norms and values (life styles)

A website that is able to communicate with consumers, needs constant supervision, because of fast moving social and cultural changes in present society. Several studies showed that insight into the mentality and lifestyle of the consumer is of the highest importance for understanding and explaining consumer behaviour (Soldaat, 2003/Derijcke, 2001/ Lampert, 2004).

The aspects described in this part form the behavioural and intellectual basis of EASY. A basis that was pilot-tested on the subject of energy efficient lighting. The operational details of this pilot test will be described below.

EASY testing on energy efficient lighting

After the development of the internet system (end of 2003), the EASY-system was in 2004 digitally tested by a large sample of the Dutch households. The aim of this pilot-test was to find out more about the usability of tailoring through Internet for energy efficient lighting.

Further, using the energy efficient lighting test case, the following questions played a crucial role during the pilot:

- the attractiveness of the EASY-system to communicate with consumers about energy efficiency;
- the attractiveness of the EASY-system to set up a relation with consumers about energy efficiency;
- the effectiveness of the EASY-system when it comes to structural changing behaviour;

Further operational details to be mentioned are:

- For the actual field research, about 60 000 households were contacted, and a representative group of 1 000 households was selected to participate in the survey. After using the principle of 'propensity', the results were made representative for the total Dutch population.
- The survey contained a questionnaire in two rounds; this in order to monitor the real effects in the change of behaviour on the field of energy efficiency.

In the survey 1 000 participating respondents were asked to generate their personal consumer profile in the system. This in order for the system to communicate the right ('tailored') possibilities for cost reduction on their personal energy-score. Then, the respondents were asked to judge the possibilities for energy efficient lighting.

Finally, the respondents were asked if they were convinced of the advantages of energy efficient lighting and -more important- if they also were willing to change their behaviour (in this case to buy energy efficient lighting bulbs). After this first round, the following results appeared:

Table 2 shows a remarkable percentage of respondents who claimed on their personal energy profile to buy energy efficient lighting bulbs (20%) or said to think about it (43%). This strengthens the indication that the chance for individual behavioural change increases if specific interventions are in line with consumers' personal circumstances (Lampert, Peek, 2002). To make sure if the respondents indeed changed their behaviour, a second evaluation round was introduced among the same participating households.

Second round

In the second round, more than 500 households were asked about the buying behaviour since their visit to the EASY website in the first round. The results were optimistic; almost 30% of the respondents answered that they really changed their behaviour and switched over to energy efficient lighting, 70% said they did not switch over. In addition, the 'switchers' (30% of all respondents) were asked whether EASY was of any influence in their decision to buy the energy efficient lighting in the meantime. Table 3 shows the results of this question.

Table 2. Attitude respondents about switching over to energy efficient lighting.

Type of attitude:	Response
1. 'No, I will not switch over to buying energy efficient lighting bulbs'	10 %
2. 'I will perhaps switch over to energy efficient lighting'	43%
3. 'Yes, I will certainly switch over to energy efficient lighting'	20%
4. 'I already use energy efficient in the household'	22%
5. 'I don't know'	5 %

Table 3. Impact of the website on buying behaviour.

Type of impact:	Response
1. 'The website had no influence me on my buying behaviour'	25 %
2. 'The website was of little influence'	58%
3. 'The website was certainly of influence'	17%

Table 3 shows that 17% of the 'switchers' claim that EASY was certainly crucial for their decision. About 60% of the 'switchers' stated that the visit to the Internet system was indeed of some influence, but they could not point out precisely how essential it was. Even though this pilot was not a scientific evaluation, the pilot indicates clearly a potential for computer-tailoring through the internet (Noort, Gevaerts, 2004). Decided is that in 2005 further research will be held in order to evaluate the system more on a scientific base.

Who is to promote EASY? Co-branding

Regarding the exploitation of the website, marketing research convinced the Ministry not to exploit the website alone, but that it is better to set up a national promotional network of 'trusted entities' for consumers. Examples of partners in this network are the National Association of Owner-occupiers, the National Consumers' organisations, the National Institute for Budgetary Control, local authorities and even housing institutions.

This was a remarkable decision of the Ministry of Economic Affairs, because it is not a common practice in The Netherlands. But in order to achieve the national targets on energy conservation, the Ministry realised that through co-operation, there is a more effective route to influence the Dutch households.

In this network, the Ministry offers partners a dedicated marketing-concept: co-branding. This means that selected partners are also formally allowed to promote the Internet system as one's own. This in order to make consumers feel that the Internet instrument is especially developed for them by the party they trust most when it comes to objectively tailor made advises for energy conservation. Practically this means that the lay out of the Internet system is also visually partly integrated in the Internet information house style of the networking partners.

So here the 'knife cuts both ways'. The result is a reciprocal win-co-operation that guarantees a robust 'close to the consumer' exploitation on a base off shared costs. The national government takes care of the (high) costs of quality and maintenance of the Internet instrument. The partners in the network take care of the costs for marketing and promoting 'close' to the consumer by integrating it with their current communication programs (generating a positive public image without many additional costs).

By the end of 2004, the interest for participating in the co-branding network is rapidly growing. In a few weeks the contending parties in the network rose to more than 20 local authorities and up to 10 large local housing institutions. And the numbers are still rising. The expectation is that in the first half of 2005 the first partners will be permitted to enter the co-branding network.

Conclusions

New information technologies like internet offer the possibility to reach target groups with 'tailored' information instead of general energy saving tips. EASY provides information that can be personalised and *fitted* to personal circumstances and motivations. This means that each visitor not only receives a personal advice, but also feedback about the positive (financial) consequences if they change their behaviour (cost reduction and CO_2 effects etc.). So, if it is possible to develop a system that consumers consider of the same quality as they expect from an expert, computer tailoring has the potential to combine a success factor for behavioural change.

It is also evident that changing human behaviour and creating user acceptance is not just a technical issue, but also a matter of marketing co-operation. The type of co-operation is a progressive one: marketing by 'co branding'. This means a partnership in which the Ministry (owner of the EASY-website) is responsible for the content and quality of the website and the partners take care of promoting the EASY-website. The interesting new aspect about this is the partnership: all partners are allowed to promote the EASY-website as one's own! The result of this promising 'new kid on the block' is therefore also a win-win co-operation that guarantees a 'close to the consumer' approach on a base of shared costs.

Of course one should notice that computer tailoring is a relatively new technique and that the results described in this paper are generated on a test-basis. Time was too short to monitor effects on behavioural changes on a long term. This spring, the website will officially be launched by the Minister of Economic Affairs. From that moment on, more scientific evaluation will take place in order to monitor the real effects on changing behaviour. Then it will also become clearer what the practical difficulties and limits will be when it comes to real behavioural changes.

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