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Abstract
 Feedback is generally used to monitor progress toward different goals and standards in life, and to adjust behaviour accordingly. EcoRunner was developed as a web-based feedback tool providing environmental and financial information about households’ daily consumption. This paper presents a user experience study of this feedback tool, and addresses the influences of goal-setting on the experience. The results show that people who more often set financial and pro-environmental goals in life find the tool more attractive, more useful, believing it to have influenced their current behaviour and believing it will be helpful when changing (regulating) future consumption behaviour. Conclusions are drawn that feedback tools like EcoRunner may have different effects for different subgroups in society. It is further suggested that EcoRunner could be used as a tool in education, at different levels in schools and higher education, for enlightening consumers about the relationship between household spending and environmental consequences.

Keywords: Consumption, EcoRunner, Environmental feedback, Goal-Setting, Interactive web tool, User experience

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Introduction

In most countries, household consumption across the lifecycle of products and services accounts for more than 60% of all environmental impact from consumption (UNEP, 2010). In Sweden, this number has been approximated to nearly 80% (The Swedish Environmental Protection Agency, 2008). Different types of behavioural feedback programs have been introduced as means of educating and influencing consumers to become more sustainable citizens. In such feedback programs, information related to the consequences of behaviour is provided either before behaviour has been performed or as a response to behaviour afterwards. Most behavioural feedback programs or tools have focused on one area of living at a time, e.g. electricity use in private homes (Darby, 2006), daily travel behaviour (Fujii et al., 2009), food habits (Shanahan, Carlsson-Kanyama & Pipping Ekström, 2003), or calorie intake (Oenema et al., 2008). However, we argue that if the aim is to achieve sustainable consumption, it will be necessary to provide consumers with feedback not only in one target area at a time, but simultaneously in all areas where the consumer/household spends money. This would provide a better understanding of where, at the individual level, behavioural change would yield the greatest result.

Feedback is used to evaluate performance and to monitor progress toward different goals in life. It can either be self-generated (Carver & Scheier, 1981) or provided by external sources, e.g. intervention feedback programs (Kluger & DeNisi, 1996). Regardless of the source of feedback, people are presumed to alter their behaviour as a response to it, a basic assumption that underlies most theories of feedback and behaviour (i.e. Bandura, 1991; Carver & Scheier, 1998; Locke & Latham, 1990). It has been argued that the relevant feedback of reliable and transparent information on the consequences of one’s own consumption is an important condition for shifting towards more environmentally friendly consumption behaviour (Gardner & Stern, 2002). The positive effects of feedback on human behaviour are well documented (Becker, 1978). Earlier research has found the effects of feedback on household waste management (Åberg et al., 1996), food consumption (Shanahan, Carlsson-Kanyama, & Pipping Ekström, 2003), energy consumption and electricity use (McClelland & Cook, 1979; Hutton et al., 1986; Ekström et al., 1996; Darby, 2006), daily travel (Fujii & Taniguchi, 2005), and calorie intake (Oenema et al., 2008). Results from some feedback programs (travel) have generated reduction levels of up to 35% (see Fujii & Taniguchi, 2005; Fujii et al., 2009), whereas results from other types of feedback program have generally yielded reductions between 5 and 15% (Gifford, 2002). Such behavioural changes may, of course, be viewed as minor at the individual level;
however, aggregated to a larger scale, they may yield considerable effects. It is also argued, however, that as many as one third of all empirical studies of feedback interventions have actually had the reverse effect (Kluger & DeNisi, 1996), i.e. a shift in an undesirable direction. One reason for this may be the rebound effect. The rebound effect entails the overall environmental benefit of changing behaviour in (only) one area possibly being lower than anticipated, or even negative (Hertwich, 2007). To exemplify, a household changes its heating system in order to be more energy-efficient, and to reduce electricity consumption and save money. Afterwards, the members of the household increase the temperature in the house to improve their level of comfort since they can now afford to do so. The result is that the calculated environmental benefit of changing the heating system is less than expected, a rebound. Another example would be the household, instead of increasing the temperature, keeping the same temperature in the new system and thus saving money and energy. However, the money saved might be used to pay for a holiday trip to Thailand for the family. The result is a total net increase in negative environmental consequences despite pro-environmental behaviour in one area of living.

**EcoRunner – A new Feedback Tool**

A web-based feedback tool called “EcoRunner” was designed to be the “best possible” modelling tool for portraying environmental effects of household consumption when it comes to flows of energy, greenhouse gases, and nitrogen, while at the same time giving accurate and specified feedback to households about how they spend their money. The tool was developed as a web-based free-of-charge scientific environmental feedback tool for all (Swedish) households aimed at increasing awareness and, ultimately, changing behaviour in a more pro-environmental direction (Frostell, Sinha, Assefa & Olsson, 2013). EcoRunner gives individualized and detailed feedback to households about how they spend their money in most areas of private daily life (excluding work-related activities), and about the resulting environmental consequences. The tool incorporates household expenses in five main categories; housing (heating, rent/interest, electricity), household purchases (bread, vegetables, shampoo, medicine), leisure (memberships, sports equipment, holidays), transportation (car purchase, public transport use, fuel), and a fifth category of compensatory measures that are beneficial for the environment (wind energy, rainforest projects, tradable emission permits). The tool bases its calculations and information feedback on the money spent by the household on 115 specified items within the five main

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1 A detailed requirement specification covering modelling and the user interface of EcoRunner can be found in Frostell et al., 2011.
categories. In EcoRunner, the households themselves record the money they have spent on the items, through their own choice on a weekly, monthly, or yearly basis, then receiving feedback about the sum of money they have spent on each item, in each main category, and in total. The tool can thus be used as a household budget organizer. The main focus, however, is on the information they receive that is related to three environmental parameters - flows of greenhouse gases, flow of energy, and flow of nitrogen - and caused by the money spent. This information is presented by item, by category, and in total, separately.

A user evaluation of an initial prototype of EcoRunner provided valuable insight into how people experience such a tool (Olsson, Shanahan & Wählander, 2009). Although the report focused mainly on issues related to the further development of that specific tool, it also highlighted issues that may be regarded as more general in character. One such finding was the diverse and contradictory experiences relating to the effort required from the user to cover all areas of consumption. Some respondents reported that they did not find it problematic at all to report on how much they spend on the different items covered by the tool; some wanted an even more detailed level in order to get a more accurate picture of reality while others reported that it was too detailed and complex. A large drop-out rate during the study was also explained as a consequence of the considerable work input required from the respondents. This raises the question of whether or not detailed and scientifically-credible environmental feedback tools, like EcoRunner, really are for everyone. Since the initial purpose of developing the feedback program was to provide a web-based free-of-charge scientific environmental feedback tool for all (Swedish) households, in order to increase awareness and ultimately change behaviour, this question is most relevant.

**Aim**

As mentioned earlier, feedback is used to monitor progress toward different goals in life (Carver & Sheier, 1981, 1998; Locke & Latham, 2002). Since the feedback provided by the EcoRunner tool was in the form of environmental and financial information, one possibility is that people with stronger goals in those areas may find the tool more attractive and useful, and helpful when it comes to changing (regulating) their consumption behaviour. To address this issue, a user experience study of the tool was performed during

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2 The 115 items are based on the international classification of individual consumption according to purpose (COICOP) used by Statistics Sweden (SCB) (SCB, 2010; see also UN, 2010). The main category of compensatory measures, e.g. paying for tradable emission permits or investing in wind power plants, is not included in national statistics and was thus modelled using standard lifecycle assessment procedures.
which the relationship between goal-setting and user experience of the tool was investigated. The importance of general goal-setting in life, specific goal-setting in life in the environmental and financial domains, and short-term specific environmental goals in the form of personal commitment to changing behaviour while participating in the study, was measured. The study was designed as an experiment in which one group of participants made specific short-term goals and committed themselves to behavioural change while participating. Another group did not make any commitments. The specific aims of the study were to:

(i) Study the influence of general goal-setting, domain-specific (environmental and financial) goal-setting, and short-term goal-setting on how the environmental feedback tool was experienced.

(ii) Study the perceived effects of the tool on present and future behaviour.

Method

Participants

A group of forty undergraduates\(^3\) and university employees at Karlstad University, Sweden, were recruited on a voluntary basis to participate in a user test of a new web tool that displays the environmental consequences of money spent on consumption. All participants received a reward in the form of a cinema ticket (approximately equivalent to 10 Euros). At the end of the test, 29 respondents had completed all the tasks. The mean age was 25.4 years, ranging between 18 and 49, with the majority being female (21 out of 29).

Procedure

An updated version of the EcoRunner tool was used in the study to provide the participants with feedback about the environmental and financial consequences of their consumption. Before volunteering, all participants were fully aware of the tasks ahead; i.e. using the tool on two occasions five weeks apart and answering a short questionnaire regarding their experiences when using the tool (after the second test). They were also aware that using EcoRunner would take approximately 20 to 30 minutes on each occasion, and that they could participate from any computer with access to the Internet. Those not

\(^3\) To increase representativeness, a mix of students and employees was used in the study. It is, however, worth mentioning that, as a group, university students in Karlstad represent the general population in several respects. They are older than the average Swedish university student, they cohabit more frequently, and they have children and part-time jobs more frequently.
having access to a computer, and the Internet, were told that the experimenter could provide this for them (no one requested this help, however).

The participants were unknowingly and randomly assigned to one of two equally sized groups, a personal goal-setting commitment group (the experiment group) or a group without any personal commitment (the control group). All participation and communication with the experiment leader took place over the Internet. EcoRunner was placed on a web page only accessible to those with a password. An email was sent to all the participants at the start of the experiment containing a short description of the tool, while also explaining that all the instructions and information needed could be found at the EcoRunner website.

As described earlier, the participants were asked to record how much money they (or their household) had spent on each of the 115 different items, divided into five main categories. If they were uncertain of the content of an item or category, they could click on a question mark beside that item and an explanation would pop up. If they were uncertain of their actual spending on a specific item, they could use a function called “average” which added a sum of money equivalent to the average spent by a household with the same composition as theirs. If they did not spend any money at all on a specific item, e.g. tobacco, they would be told to leave that box blank or write a zero. To make it as easy as possible to accurately remember and report on their spending, an option to choose a timeframe was made available. It was also possible to choose a timeframe for consumption; a week, a month, or a year. For instance, spending money on garden equipment may be easier to report on a yearly basis, housing may be easier on a monthly basis, and bread, fruit, and meat may be easier on a weekly basis. The calculations made by the tool took this into account, displaying all the feedback related to spending and environmental consequences on a yearly basis. A screenshot of one page of the tool can be seen below in Figure 1.

As can be seen, the participants recorded the money they spent on each item in boxes in the middle of the page, then receiving aggregated results for environmental parameters on the right-hand side, in both numerical and graphical form. This information was updated as they added items. The numerical display also compared their personal result with the “average Swede”. Once they had entered the money they had spent, they then clicked on a results tab where they could see how much money they spend in daily life alongside the consequences regarding the flow of greenhouse gases, energy, and nitrogen. They were given the opportunity to save the results in a personal account within the tool,
only accessible to themselves, by entering a personal username and password. They could also make a pdf document to be printed out or saved on their own computers for comparison later on.

Figure 1. Screen shot of EcoRunner showing the main category of Transportation. The other four main categories (housing, household purchases, leisure, and compensatory measures) are accessed by clicking on tabs on the green menu bar towards the top of the page.

One week after EcoRunner had been used for the first time all the participants received an email. The participants in the control condition received a thank-you note for completing the first test, also telling them that a reminder would be sent when it was time for the second test. Those in the experimental condition received both the thank-you note and a request to set a personal goal and make a personal commitment to changing their behaviour in some way during the next few weeks in order to lessen their impact on the environment. They did not have to show their commitment to anyone, not even to the experiment leader. However, to make the commitment realistic and not just a thought-
experiment, they were instructed to send themselves an email containing the commitment in writing. Since, at the time of recruitment, they were only asked to test the tool and answer questions about their experience, they were all told that setting a goal was optional, but that it would be much appreciated if they decided to do this. A new email was sent to all the participants three weeks after the reminder, telling them that it was time for the second test of the tool. In the same email, there was a link to a web questionnaire to be answered after completing the second test of EcoRunner.

Measures
A questionnaire was constructed which was divided into seven blocks; (i) three questions related to how frequently goal-setting is generally used in life while two questions related to how frequently goals are set in specific areas of daily life (personal finances and pro-environmental behaviour). The questions were answered on a 7-point Liker scale ranging from 1 very seldom to 7 very often; (ii) two questions related to perceived behavioural change as a consequence of participating in the study and using the tool, phrased as: I have changed my consumption to a very large extent since first using EcoRunner [present behaviour], and I believe EcoRunner will influence my future consumption considerably [future behaviour], also answered on a 7-point scale from 1 I do not agree at all to 7 I completely agree; (iii) a set of 11 questions on the user experience of the feedback tool. The questions captured attributes pointed out as important in previous studies of feedback tools and were divided into two subsections: experience and usability. The attributes for experience were: It took too long to use, Using EcoRunner made me enthusiastic, It was very hard to make correct approximations of my own and my household’s spending for all items, and I felt very bored while using EcoRunner; while for usability they were: EcoRunner has a very high level of usability, The instructions were very unclear, Using the “update” function was very simple, I experienced great difficulty choosing the timeframe for my spending, The presentation of the results was of very high quality, and There was way too little text and information within the tool. All the questions were answered on a 7-point scale ranging from 1 I do not agree at all to 7 I completely agree; (iv) a single yes/no question about whether or not they had made a commitment to themselves to change their behaviour in some way after using EcoRunner on the first occasion; (v) one question where the respondents were given the opportunity to write down in their own words in what way (if any) they had changed their behaviour as a consequence of using EcoRunner. The question was added in order to obtain some indications of the kind of behavioural changes the feedback tool had led to; (vi) background characteristics (age, gender, and household characteristics); and (vii) at the end, an open-ended question where they were given the opportunity to make personal
Comments or suggestions related to refinements of EcoRunner. (This will not, however, be presented here since it is outside the scope of the paper.)

Results
Based on the blocks in the questionnaire, a number of different analyses were performed and are presented below in subsections.

Commitment to change
First, looking at the experimental manipulation, a difference could be observed between the experimental condition (commitment to change) and the control condition (no commitment to change) as regards how the participants believed that the tool had made them change their current consumption ([M=3.63commitment vs. M=2.43no commitment] \( t[27]=1.86,\ p=.07 \). No such difference was observed with respect to beliefs regarding future consumption.

Further analyses showed significant differences between the conditions of the experiences when using the tool. The participants in the experimental condition were not bored at all by EcoRunner, whereas the participants in the control condition reported boredom at around the mid-point of the scale ([M=1.38commitment vs. M=4.10no commitment] \( t[27]=-4.08,\ p<.001 \). Looking more closely at the distribution of the answers, an unequal distribution between the conditions was observed whereby those in the experimental condition only gave ratings on the two lowest levels of the scale, whereas an approximately equal distribution on the scale was observed for the control condition.

Analyses of the clarity of the instructions for the tool showed that the participants in the control condition experienced the instructions as being less clear than did those in the experimental condition ([M=3.62no commitment vs. M=2.00commitment] \( t[27]=2.44,\ p<.05 \).

Type of change
A variety of different actions were described in the open-ended question regarding specific changes in behaviour as a consequence of using EcoRunner. Although only 41% of the participants wrote down the specific actions taken, on average these participants reported more than two different actions. These actions can be divided into four main categories; (1) energy and electricity reductions, (2) less total purchases and more deliberate thinking, (3) increased use of public transportation, and (4) increased consumption of eco-labelled and locally-produced food. To give some examples, one participant wrote “I now think more about what I buy and make less impulse purchases”, while a second wrote “I buy more legumes and less
meat, and have lowered the temperature in my house”, and a third one wrote “I recycle, buy locally-produced food, try to make my neighbours pay more attention to what they buy, and have replaced all my light bulbs with energy-efficient ones”.

Goal-setting

Ratings regarding how frequently people use goal-setting in both general and specific areas of life can be found in Table 1. As can be seen, financial goals are set more frequently than environmental goals, and environmental goals are set less frequently than general goals in life.

Table 1. Means and standard deviation for how frequently the participants set general and specific goals in their lives.

<table>
<thead>
<tr>
<th>How frequently do you:</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>General goals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set concrete goals in daily life</td>
<td>4.76</td>
<td>1.43</td>
</tr>
<tr>
<td>Use goals as a motivator</td>
<td>5.10</td>
<td>1.95</td>
</tr>
<tr>
<td>Evaluate your goals</td>
<td>3.86</td>
<td>1.43</td>
</tr>
<tr>
<td>Specific goals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Set goals related to your financial situation</td>
<td>4.90</td>
<td>1.72</td>
</tr>
<tr>
<td>Set goals related to pro-environmental behaviour</td>
<td>4.31</td>
<td>1.83</td>
</tr>
</tbody>
</table>

To investigate the relationship between general goal-setting in life and experiences concerning the feedback tool, a goal-setting index (GSI) was created as regards the three questions related to general goals. A satisfactory level of reliability was obtained (Cronbach’s alpha = .82). Correlation analyses between the GSI and the perceived effects of EcoRunner on present and future behaviour revealed a significant positive correlation for present ($r[29]=.49, p<.01$) as well as future behaviour ($r[29]=.59, p<.01$), which means that the higher the score on the GSI - the stronger the belief that EcoRunner had influenced present behaviour and would influence future behaviour.

The two variables related to the frequency of specific goals (pro-environmental and financial) were each split in two groups separating those reporting values above the mean with those reporting values below the mean of each variable respectively. Analyses of the pro-environmental goal variable showed that participants above the mean rating believed that the tool had influenced them to a greater extent. This was found in both their present consumption ([M=3.39$^{\text{above}}$ vs. M=1.73$^{\text{below}}$] $t[27]=3.06, p<.01$) and their belief about future consumption ([M=3.78$^{\text{above}}$ vs. M=2.55$^{\text{below}}$] $t[27]=2.09, p<.05$). The same analyses were performed for the financial goal variable, but without any significant differences being observed.
Attributes of the experience

The responses to the questions about the attributes related to experiencing the tool are reported in Table 2. Comparing participants who less frequently set specific goals in their daily lives with participants who do so more frequently yielded significant differences with regard to the experience of time use (high vs low pro-environmental goals: \( t[27]=2.90, p<.01 \), and high vs low financial goals: \( t[27]=2.65, p<.05 \), respectively), where users who less frequently set specific goals experienced, to a greater extent, that the tool took too much time to use. Analyses of the attributes related to the emotional dimensions of the user experience, enthusiasm and boredom, indicated that users who more frequently set pro-environmental goals rated their experience of using the tool as both less boring (\( t[27]=1.83, p=.08 \)) and more enthusiastic (\( t[27]=-1.97, p=.06 \)).

Table 2. Means and standard deviation for the 11 questions relating to the importance of different aspects of the experience of EcoRunner, reported separately for those above and below the mean rating on pro-environmental and financial goals. The scores were all rated on a 7-point scale ranging from 1 (I do not agree at all) to 7 (I completely agree).

<table>
<thead>
<tr>
<th>Experience</th>
<th>Pro-environmental goals</th>
<th>Financial goals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Above mean</td>
<td>Below mean</td>
</tr>
<tr>
<td>Took too much time to use</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Using EcoRunner made me enthusiastic</td>
<td>3.12**</td>
<td>1.69</td>
</tr>
<tr>
<td>I felt very bored while using EcoRunner</td>
<td>3.89*</td>
<td>1.75</td>
</tr>
<tr>
<td>It was very hard making correct approximations of my</td>
<td>2.83*</td>
<td>1.50</td>
</tr>
<tr>
<td>own and my household’s spending on all items</td>
<td>4.89</td>
<td>1.45</td>
</tr>
<tr>
<td>Usability</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The presentation of the results was of very high quality</td>
<td>5.12</td>
<td>1.32</td>
</tr>
<tr>
<td>EcoRunner has a very high level of usability</td>
<td>4.50</td>
<td>1.58</td>
</tr>
<tr>
<td>Using the “update” function was very simple</td>
<td>4.44</td>
<td>1.58</td>
</tr>
<tr>
<td>The instructions were very unclear</td>
<td>3.17</td>
<td>1.47</td>
</tr>
<tr>
<td>There was way too little text and information within</td>
<td>3.39</td>
<td>1.14</td>
</tr>
<tr>
<td>the tool</td>
<td></td>
<td></td>
</tr>
<tr>
<td>I experienced great difficulties choosing the</td>
<td>2.56</td>
<td>1.58</td>
</tr>
<tr>
<td>timeframe for my spending</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\* = \( p < .10 \)

\** = \( p < .05 \)
Discussion

“I recycle, buy locally-produced food, try to make my neighbours pay more attention to what they buy, and have replaced all my light bulbs with energy-efficient ones.”

The quote above is one participant’s description of behavioural changes in relation to using the EcoRunner feedback tool. In the best of worlds, this would hold true for all consumers. Unfortunately, when looking at the results of the present study, the reality is that not all consumers are affected in the same way. An important finding is that people who more frequently set general goals in life believed that the feedback tool had influenced their present behaviour to a greater extent. They also believed that it would influence their future behaviour more than people who set goals less frequently in life. One reason for this could be that frequent goal-setters regularly use feedback as a strategy for monitoring their progress towards different goals in life and may also, thus, be more skilled at using a feedback tool such as EcoRunner to guide their decisions.

Looking at those who more often set pro-environmental goals revealed that they experienced EcoRunner as less time-consuming, and leading to a higher degree of enthusiasm and less boredom. More importantly, they believed that the tool had influenced their present behaviour to a greater extent, and that they expected it to influence their future behaviour. Participants who less frequently set financial goals indicated to a greater extent that they experienced the tool as time consuming. Furthermore, although no significant difference was observed between the groups as regards the attribute related to the difficulty of making correct approximations of the money spent on the items in the tool, it is important to recognize that, on average, this attribute was rated as the strongest by all. In other words, people generally have limited knowledge of how they actually spend their money. This is a fact indicating that a tool such as EcoRunner, which combines environmental information with financial information in the form of a household budget organizer, can be used both as an alarm clock for households with regard to how they regularly spend their money and, more importantly, as a contributing factor in developing the insight that there are also environmental accounts/budgets that need to be taken into account. Also, since the information provided by EcoRunner applies to all areas of private consumption, the tool may also serve as a mechanism for reducing possible rebound effects. That is, users can clearly see the overall environmental benefit from spending less
or changing their behaviour in one area in addition to the possible negative consequences if the money saved in one area is spent in other areas. Based on the results of this study, a question that arises is how and by whom feedback tools such as EcoRunner should be used. The results clearly suggest that, to obtain the largest behavioural effects, EcoRunner should be addressed to subgroups that usually set environmental goals in their daily lives, as a means of enabling them to see where to put their efforts in order to gain the largest reduction of negative environmental impact. However, since one of the primary aims of the EcoRunner project was to develop a tool addressed to all Swedish consumers, measures must be taken to reach the uninterested. One way to go is to use EcoRunner as an educational tool, at different levels in schools and higher education, to enlighten consumers about the relationship between spending and environmental consequences. Working with the tool may produce light bulb moments at many levels, both with regard to gaining insights into the actual spending of a household, but also with regard to how this can be related to a sustainable future.

During the spring of 2011, the EcoRunner tool was released to the general public and has since that been freely available at http://ecorunner.industrialecology.se/. By monitoring the data entered by different household types – such as single or cohabiting, with or without children, young or senior citizens - the EcoRunner tool will provide valuable insights on a larger scale of the consumption patterns in different subgroups in society. It will also give a deeper knowledge of the effects of feedback on consumption behaviour over time.
References


Feedback is generally used to monitor progress toward different goals and standards in life, and to adjust behaviour accordingly. EcoRunner was developed as a web-based feedback tool providing environmental and financial information about households’ daily consumption. This paper presents a user experience study of this feedback tool, and addresses the influences of goal-setting on the experience. The results show that people who more often set financial and pro-environmental goals in life find the tool more attractive, more useful, believing it to have influenced their current behaviour and believing it will be helpful when changing (regulating) future consumption behaviour. Conclusions are drawn that feedback tools like EcoRunner may have different effects for different subgroups in society. It is further suggested that EcoRunner could be used as a tool in education, at different levels in schools and higher education, for enlightening consumers about the relationship between household spending and environmental consequences.