

Enhancing Environmental Citizenship and Reducing Energy Consumption through Creative Engagement with Building Users

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Abstract

This paper reports on research which focuses on the impact that users' behaviour has on the energy consumption of buildings and how to effectively engage users in energy reduction strategies. The research seeks to understand how work-based communities engage with energy and evaluates the impact that building-users can have on workplace energy reduction. The work is being conducted in De Montfort University, UK, and it addresses the need to lower UK Higher Education sector emissions.

The awareness that our life-styles are damaging the environment has raised questions about who should take responsibility for preventative action. Many attempts at 'pro-environmental change' rely upon individualistic and rationalist assumptions. Alternatively, public participation is increasingly considered to be an important aspect in the success of behaviour-change processes. It is widely accepted that if people have the opportunity to participate in decision-making processes, they will be more likely to adopt the outcome of the decisions. This principle has been successfully applied in the context of waste management and landscape planning, but has less of a track record of application in the context of energy use.

Using an action research methodology, the aim is to evaluate the use of social media as a tool to engage users in the workplace environment and then to monitor subsequent behaviours. The research, currently in its initial stages, will provide insights into how social media can be used in large organisations for facilitating communication, the exchange of pro-environmental information and the impact on behavioural change.

Introduction

The paper presents a study that is focused around the research question: "Can social media tools be used effectively to foster an interactive, participatory process that increases environmental citizenship and reduces energy consumption in institutional buildings?" It discusses the theoretical importance of a participatory engagement approach (Owens 2000; Webler & Tuler 2000; Webler et al. 2001) and the fact that this approach is today more feasible with the advent of social media tools. This approach re-invents the usual program design paradigms, which are top-down, and replaces it with an organic process. The study moreover employs an 'action research' methodology. This is an approach that changes the normal relationship between researcher and the researched (which is also top-down), creating an effective collaboration of the researcher and the subjects to accomplish the goals. Social media tools mediate these processes, following the idea that Web 2.0 tools and social media are facilitating and making possible greater public participation in contemporary society. The assumption is that the participatory approach will lead to two connected goals: first it will increase 'environmental citizenship' and this will lead to the second goal, decreasing energy consumption in buildings.

The study is being conducted in De Montfort University (DMU), a UK university based in the City of Leicester, and it addresses the need to lower UK Higher Education sector emissions.

At the time of writing the research is in its pre-intervention data collection stage. The collected data are both qualitative and quantitative.

Motivation of the Study

The present research is motivated by four main starting points. First, the fact that climate change is a priority for the UK Government. Second, the idea that university and institutional buildings can lead by example and work as a catalyst in the energy reduction context. Third, the notion that the built environment represents a large part of the overall EU energy consumption. Fourth, the assumption that ‘building don’t use energy, people do’ (Janda 2011, p. 17) which leads to a focus on behaviour change.

UK Mission to a ‘Low Carbon Economy’

In England and Wales, the Government has defined climate change as a priority issue and committed to a ‘low carbon economy’, responding to the international agreements on cutting carbon emissions. The Climate Change Act requires a national cuts in CO₂ emissions of 80% by 2050, on the 1990’s level (UK 2008). The target was set to limit the concentration of CO₂ in the global atmosphere to no more than twice the pre-industrial level, that would mean a cut of 60% of carbon emissions (RCEP 2000). The Royal Commission on Environmental Pollution decided to increase the cut to the 80%.

Universities as a Public Good

The UN Decade of Education for Sustainable Development (DESD) 2005-2014 states that “Universities must function as places of research and learning for sustainable development” (Arima, Konare’ et al. 2005, p. 24). The UK’s new sustainable development strategy (Securing the Future: delivering UK sustainable development strategy) emphasises the role that education can play in both raising awareness among young people about sustainable development as well as giving them the skills to put sustainable development into practice (HEFCE 2005). The UK government places a priority on the development of sustainability literacy as a ‘core competence’ among graduates (Dawe et al. 2005).

De Montfort University has made a commitment to bring sustainability into the heart of its organisation, as stated in its Strategic Plan 2011-2015. The aim is concretised not only through teaching and research, with the ambition of transforming staff and students in responsible environmental citizens, but also in concrete intervention on the built environment (DMU 2011). Numerous initiatives are currently in place at DMU, both from the technological point of view, with the implementation of buildings with new and efficient systems and appliances, and from the behavioural point of view, with numerous programs for stimulating engagement of staff and students in pro-environmental behaviours, e.g. the Green Impact and the Environmental Champions programs.

In addition, the work is potentially relevant in other institutional or workplace context, not only to university settings.

The Importance of the Built Environment for Energy Use Reduction

The building sector consumes about 40% of the total energy consumption and emits about 35% of total CO₂ emissions in Europe (Dascalaki et al. 2010). Consequently, reducing energy consumption in the building sector is an important step in reducing European carbon emissions.

A carbon footprint baseline assessment of De Montfort University, identified as a generalized example of a UK university, showed that buildings energy contribute for the 39% and procurement for the 31% of total emissions, while travel provides the remaining 30%. These data clearly show that there is a wide potential in reducing energy use and carbon footprint in DMU’s buildings.

Institutional buildings. The interest of the DMU research is how to engage people in their work and/or study environment in energy reduction behaviours. Research has so far focused primarily on individuals in a domestic setting. For example, research is being conducted into the efforts of increasing people's awareness of energy consumption in their homes by the use of smart meter systems (Burgess & Nye 2008; Darby 2006; Hargreaves 2010; Weiss et al. 2009). Many attempts to reduce energy consumption in the domestic setting have used the prospect of saving money to promote energy saving (Frey & Stutzer 2006).

In the workplace, however, the employees are unlikely to pay for their consumption. Moreover, there is a perceived tension between the productivity of employees and the demand of reducing their electricity consumption by switching their computers off (Bull et al. 2011).

The perception of inadequate action by local and national government is also a substantial barrier to engagement in pro-environmental behaviour among UK citizens (Lorenzoni et al. 2007). People are reluctant to change their own behaviour when they feel others will not follow, because in the context of a worldwide issue such as climate change they feel their own little action do not have enough impact. This is one of the reasons why action in universities and in other institutional buildings may have a wider impact than the actual cut in energy consumption (Bryan et al. 2011).

100% of Energy in Buildings is Affected by People's Decisions and Actions

It is difficult to estimate the percentage of energy use for which the building's occupants are responsible. The dissimilarities that occur in individual behaviour can in fact produce significant differences. In this context, Janda shows that "building don't use energy, people do" (Janda 2011, p. 17). According to her research, individual actions account for approximately half of the energy consumption across all sectors, while people in their roles as decision-makers in institutions and their choices account for the other half. If we took this perspective, people are responsible for the whole energy use in a building.

Behaviour, individually and collectively, is therefore clearly important in the context of energy use. Therefore the question is not if people need to change their behaviour, but how deeply and how soon they have to act in order to secure a sustainable energy supply for the future (Owens & Driffill 2008).

Enhancing environmental citizenship. In the domestic setting, numerous barriers have been identified relative to the attitude of people in engaging in pro-environmental behaviours, such as individuality, practicality, and responsibility (Blake 1999). Responsibility is closely connected to the cost of energy; paying the bill for energy consumption directly means being responsible for the energy use. But responsibility has a deeper value; it is connected with the idea of using energy in a responsible way, not only not to harness our environment, but also not to waste it. Being aware and concerned that our actions have an effect on the environment, even if we don't see it, is one of the essential points of ecological citizenship (Dobson 2007; Dobson & Bell 2006).

The DMU research will test the hypothesis that using a social media-based participatory approach to increase collective environmental citizenship will result in energy reduction behaviours.

The Participatory Approach in Study Design and Research Methodology

Theoretical Background for the Participatory Approach

Traditionally, attempts to change people's attitude and behaviour have been carried out through a top-down educational system. These theories are based on a rationalist 'information-deficit model' (Burgess et al. 1998); they are founded on the assumption that providing people with information would make them change their behaviour. However, studies have shown that this approach has very little and sometimes no impact upon behaviour (McKenzie-Mohr 2000; Lorenzoni et al. 2007). This approach has been used in numerous mass media initiatives in the UK, for example the 'Going for Green' and 'Are You Doing Your Bit' campaigns (Collins et al. 2003) and is at the base of numerous policies (DEFRA 2008). Although the impulse of tackling behaviour and attitude change through knowledge-provision may remain solid, other roads should be explored in this context. Information alone is in fact inadequate to tackle the behaviour change issue (Owens & Driffill 2008).

Applied to territorial planning (Petts 2006) and waste management (Petts 2001) since the 1990s, participatory processes have shown themselves capable of helping society to change its attitude and its actions towards a pro-environmental model. And it is today a widespread idea that the lay public should be involved in decision-making processes regarding environmental issues (Arnstein 1969; Few et al. 2006; Petts & Brooks 2006; Owens 2000; Webler et al. 1995; Webler et al. 2001; Webler & Tuler 2000;).

The innovative contribution of participatory process. The innovative contribution of participatory process is the establishment of a new relationship between expert and lay comprehension about a topic. This relationship encourages learning about distinct viewpoints, opinions and education, in a bi-directions process may incorporate the difficulties of making specialised knowledge widely understandable and of translating concrete and everyday problems and concerns into an expert dialogue (Petts 2006). The main innovative point has been to consider that while the knowledge of experts is valuable, the experience of laypeople is also important, especially in the context of local issues. The argued reason for promoting a participatory approach is that public engagement is not only 'the right thing to do', from a democratic point of view, but also that it will guide the process to superior outcomes.

Grounded in Habermasian theories of the 'ideal speech situation' and of communicative competence, the theoretical principles for public engagement are fairness, competence and social learning (Webler et al. 1995). Competence is increased if local and lay expertise is involved in the process and when professional knowledge is publicly tested. The process and its outcome are more impartial if the different concerned groups can have equal chances to influence the outcome. But what is also very important is that "when citizens become involved in working out a mutually acceptable solution to a project or problem that affects their community and their personal lives, they mature into responsible democratic citizens and reaffirm democracy" (Webler et al. 1995, p. 444).

Letting people be involved in the decision-making process is an enhancement of democracy. This is the central concept for the present research. It is an issue of democracy to decide whether the control is left to an automated system or to the occupiers of a building. The aim of the present study is to understand if a bottom-up approach, that sees the participation of building users in the decisions about energy use and control, can lead to a better use of resources in the workplace. The complementary starting point is the idea that people have the right of determining their own comfort in the place they work and they have the right of control, in the same way they have the right to participate in decision-making processes of different natures.

Social learning: one of the essential outcomes of a participatory approach. With social learning, participants achieve new knowledge and learn to incorporate their personal concerns with

collective ones, therefore becoming more competent to make evaluations. Habermas's theories explain that social change is a process of social learning; human societies can learn to change to adapt and mitigate the effect of health and environmental problems (Habermas 1979 in Webler et al. 1995).

The process of social learning, moreover, spreads beyond the participation process; as Bull et al. stated "participation has gone on to affect their social networks, colleagues and neighbourhoods" (Bull et al. 2008). The success of a participatory process depends also on what the people outside the process think, because not all the interested parties can be personally involved in the process (Webler et al. 1995). This is particularly important when the process is conducted using social media, a platform where information can easily and quickly spread. One of the questions when talking about social learning is whether the learning is the first step of a deeper process that leads to the enhancement of environmental citizenship (Bull et al. 2008).

Testing the hypothesis: participation leads to enhancement of the sense of environmental citizenship in engaged individuals. A direct and causal link between the participatory process and the enhancement of environmental citizenship has not been tested by previous studies. However, it is certainly true that such processes have a value in illuminating social contexts and promote confidence in individuals in terms of their own role and capacity to act (Bull et al. 2008). The open question is whether this process can lead to long-term learning, and not only be confined to the public engagement process in itself (ibid.).

Webler et al. state that when citizens become involved in working out a mutually acceptable solution to a problem that affects their community, "they mature into responsible democratic citizens and reaffirm democracy" (Webler, Kastenholz et al. 1995, p. 444). Being responsible citizens in the context of environmental citizenship means going beyond individual rights.

It is argued that today society's dominant paradigm is anti-environmentalist (Pirages and Ehrlich 1974 in Dunlap, Van Liere et al. 2000). In this view environmentalism is a challenge to our fundamental beliefs about nature and human relationship; environmentalist visions are today rather widespread and tension is noticeable in society between environmentalism and anti-environmentalism. In the traditional concept of citizenship individuals have civil and social rights. In this conception the environment is conceived as a property (Bell 2005). In environmental citizenship theory, the environment has the essential role of supplying individuals' basic needs, and it is recognised that humanity's survival depends on the physical environment (ibid.).

The environmental citizen may be different from the average citizen, because environmental citizenship asks people to act differently for the sake of the environment. Environmental citizenship is the idea of making environmental conservation and sustainability an important duty of citizenship (UNEP 2002). The core of environmental citizenship is the idea that human beings are 'citizens of the environment', seen both at the global and the local level (Bell 2005). Therefore they have rights and duty towards the environment (for example they have the right to clean water and air, on the other hand they have the duty to preserve air and water from pollution).

Theoretical Background – Action Research Methodology

Due to the many common characteristics with the public participatory theory, action research was chosen as the appropriate methodology for the present study (the links are demonstrated by Table 1). Action research can be defined as an approach that "focuses on simultaneous action and research in a participative manner" (Coghlan and Brannick 2001 in Gray 2004, p. 374). In this approach the researcher is an integrative part of the research study and a strong collaboration between researcher and researched is sought (Robson 2002). This is the case of the present research.

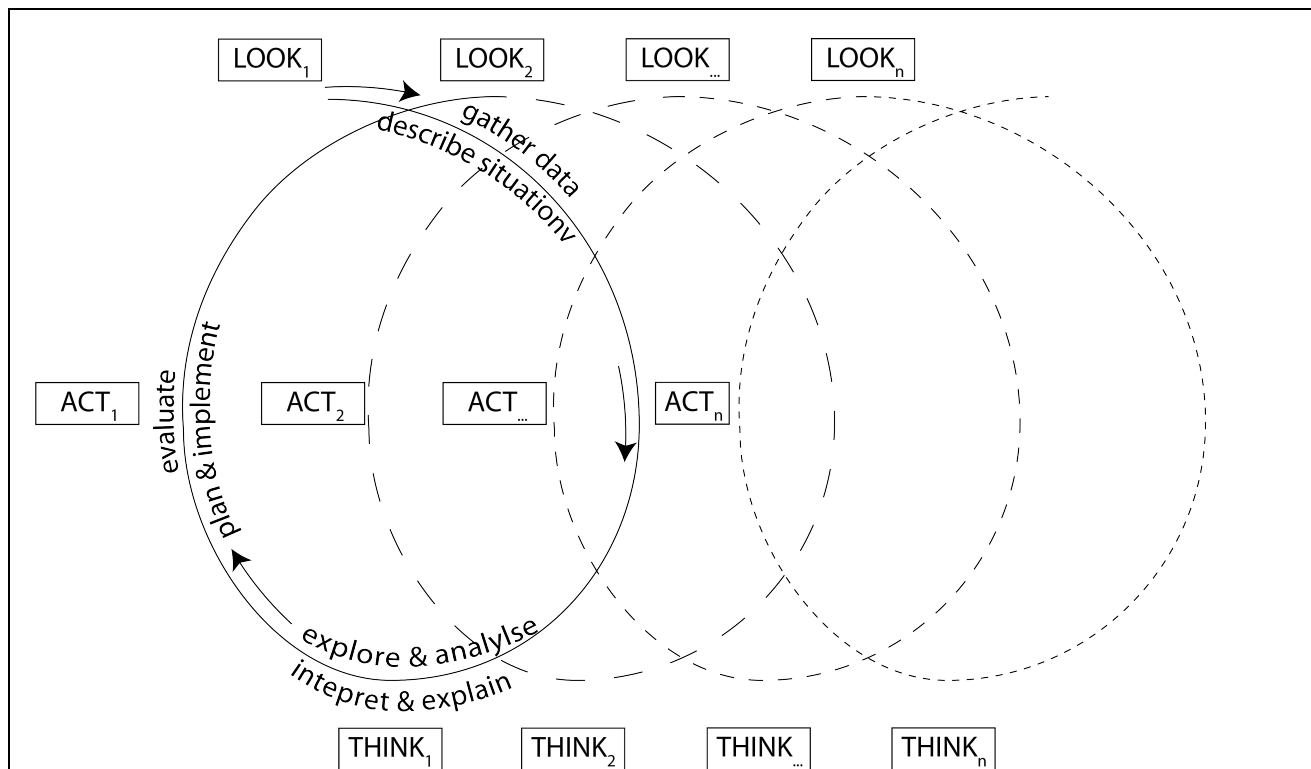
Table 1. The links between public participation theory and action research methodology

Action research	Public engagement process
The researcher is seen more as a facilitator than an `expert`. The researcher in fact is not there to offer solutions but to enable people to develop their own analysis of the issues facing them and the potential solutions (Gray 2004).	One of the main characteristics of participatory approaches is that it aims not to impose solutions from the `expert` point of view, but to construct a solution that would take into account the knowledge of all stakeholders.
Promote feelings of equality for all involved (Gray 2004).	Fairness is one of the theoretical principles of participatory processes (Webler & Tuler 2000).
The researcher is asked to listen attentively to people and regularly advise others as to what happening (Stringer 1999).	Ensuring that everyone has the possibility and the ability to speak in the meetings and ensuring that everyone (also the broader community) is up-to-date about the process (Petts 2006).
Enable significant levels of involvement.	Participants must have the opportunity to freely initiate discourses and to equally participate in the discussion. Participants must have the possibility to contribute in the decision-making; this means that everyone should have the same opportunity of influencing the ultimate outcome of the process (Webler & Tuler 2000).
Maximise the involvement of all relevant individuals and ensure that all relevant groups benefit from activities (Gray 2004).	Fairness refers to the possibility of every affected group to adopt an authentic position in the decision-making process (Webler & Tuler 2000).
Action research is seen as a tool for bringing about democracy (Lewin 1946 in Robson 2002).	Public participation is an enhancement of democracy (Arnstein 1969).
One of the outcomes of action research is that learning is generated among the participants (Gray 2004).	Social learning is one of the most important outcomes of a public participation process (Webler et al. 1995).

Kurt Lewin was the first to use the term `action research`, interpreting it as a way of learning about organisations through trying to change them (Robson 2002). Action research has been a popular approach in educational settings, and subsequently has been used in health and social work projects, in organisational development, and in urban and economic development (Robson 2002). Its operation demand changes and action, both of the system under consideration, and of the people involved in that system (McNiff 1998).

The application of action research is visualised as a `look, think, act` routine that replicates itself in a spiral activity (Figure 1) (Stringer 1996). That means that both the researcher and the researched explore their activities through a constant process of observation, reflection, and action. At the completion of each set of activities, they will review (look again), reflect (re-analyse), and re-act (modify their actions) if necessary.

Figure 1. Action research application routine. (Re-elaboration from Stringer 1996 pp. 16-17)



Social media as a tool for participatory engagement and action research. Social media and Web 2.0 tools are considered in the research's literature review because of their role in contemporary society as a tool for creating content.

The term Web 2.0 is today associated with web-applications that facilitate participatory information sharing and collaboration on the Web (Sharma 2009). A Web 2.0 site allows users to interact and collaborate with each other as creators of content in a virtual community, in contrast to websites where users are only passive viewers of content that was created for them. Examples of Web 2.0 include social network sites (SNSs), blogs, wikis, video sharing sites, and hosted services. SNSs are a relatively recent phenomenon. There are a large number of different social network sites, such as Facebook, MySpace, Twitter, that are quite consistent in their technological features, but varied for the cultures that emerge from them. Since their introduction, SNSs have attracted millions of users and have been integrated into people's daily practices (Boyd & Ellison 2007).

The popularity of social networks has grown in the past 5-10 years. Their impact was made visible in 2006 when the TIME magazine elected 'You' to be the Person of the Year.

One of the most important moments for showing real-world impact has been the 2008 Barack Obama campaign for the U.S. Presidential election. Obama employed one of Facebook's founders to design his social network campaign achieving the aim of wide-spreading his message and of mobilising supporters for taking action (Willard 2009). Other examples can be found in the organisation of the protesters' movement during the 'Arab spring' in 2011. In Egypt, for example, demonstrators organised the protest without needing to meet in one place, the discussions happened on line (Alexander 2011).

Social networks have an important role in supporting participation; they structurally link participants one with the other and make it easier to find opportunities. The 'link mechanism' is one of the most powerful mechanisms of social networks. Social web sites in fact link together people, members, events, pages and groups. This mechanism makes it easier for people to know new ideas and new social movements, because their 'friends' have been engaged in them. It is the viral nature of social networks that lead to this goal. People can share quickly and easily information with a

number of contacts, even people they do not know, in a way not possible before the birth of social network sites. “It is within these large networks that ‘social contagion’ is possible, leading to changes in behaviour and actions” (Christakis 2008, February 25).

The links between participatory processes and social media. The analysis of both the participatory process and of social media phenomena shows that there are numerous characteristics they have in common. Table 2 demonstrates why social media platforms could be particularly effective tools in participatory approaches.

Table 2. The links between public participation theory and social media

Public participation processes	Social media
Bottom-up approach	Bottom-up phenomenon
Citizen knowledge	Everyone can participate and create content in the online discussion
Access to information	Everybody have access to ‘instant’ information. The ‘linking’ mechanism makes easier for people to know new ideas or movements
Equality in the process	Information is shared without geographical and demographical constraints
Information (or knowledge) can spread outside the participatory group	Information can easily spread outside the group of ‘friends’
The process facilitates the dialogue between different stakeholders and between experts and lay people	The possibility of adding comments transform information into an interactive dialogue (online journal papers for example)
The process is an enhancement of democracy	Social media have been used to ask an enhancement in democracy

Energy feedback: important tools for making energy visible. A central problem in encouraging individuals to reduce their energy consumption is that energy is an “abstract and invisible force” (Burgess & Nye 2008, p. 4454). It is invisible for several reasons: its own physical characteristic, it is brought into buildings through hidden pipes and wires, and it is difficult for the average consumer to make connections between his daily activities and the energy levels these activities use (Hargreaves et al. 2010). From this argument comes the idea of the importance of feedback in making energy visible and easier to control (Darby 2006).

Research in the domestic context has shown that feedback is effective in reducing energy consumption. Depending on the nature and type of the feedback, studies have shown that an average saving of 5-15% can be achieved (Darby 2006). The savings are a result of a change in behaviour that leads to using devices less and/or more efficiently.

The theoretical background for the use of feedback is based on the assumption that feedback on energy use fills an ‘information deficit’ among individuals and that they will rationally reduce their consumption to save either money or emissions (Wilhite & Ling 1995). On the other hand, feedback is also seen as a learning tool (Darby 2006) that can mediate the relationship between daily activities and energy use giving the consumer the opportunity to question both the nature of their energy consumption and the lifestyle choices that underpin their energy use (Burgess & Nye 2008).

In feedback research two areas have been largely overlooked. Firstly, there are missing studies on the evaluation of what type of information is valuable to users and how to present it. Feedback on energy consumption is often presented in a technical and non-interactive way on devices that lack the ability to motivate users (Weiss et al. 2010). Feedback has been shown to be successful when their interface is clear, simple and flexible and can be adapted to meet users’ needs

(Froehlich 2010; Weiss et al. 2009; Weiss et al. 2010). Secondly, very little research has been conducted on feedback devices in non-domestic buildings.

Although the effectiveness of the feedback system for reducing energy consumption, the research is not primarily interested in developing a better feedback device for non-domestic buildings. Feedback is one of the tools that are essential to guarantee the competence of the participatory process.

Study Design and Measurement

As previously stated, the main aim of the research is to determine if social media tools can be used effectively to foster an interactive, participatory process that increases environmental citizenship and reduces energy consumption in institutional buildings. To achieve this aim different steps and methods of evaluation are used:

Prior to Intervention - Evaluating Baseline Conditions

Tracking frequency and content of pre-test social media interactions. In collaboration with the Sustainability Office at DMU, a Twitter account (@SustainableDMU) and a Facebook page have been created. The accounts have been launched prior to the intervention to create a number of followers, in order to gain a considerable attention from DMU staff and students.

The first step to track social media interaction is to circumscribe DMU social media network within the large overall network. That is realised by analysing followers and following of the top 25 social media users at De Montfort University. The analysis gives us a network of users that are currently active social media users in the university. Following this first step a content analysis of the topic discussed by this network of people is realised through keywords relevant when talking about sustainability; e.g. energy use, pollution, environment, etc. The analysis of the frequency of these keywords in DMU social media network gives the quantitative data for a baseline of engagement around sustainability issues. The same analysis will be done every week during the intervention and after it; data will be compared to see if intervention has been successful.

Conducting pre-intervention surveys on environmental citizenship and energy behaviour.

This step involved preparing and conducting a pre-study analysis, focused on environmental citizenship and self-reported energy behaviour in buildings. The pre-study is composed of three different data collection methods: an on-line survey which will collect both qualitative and quantitative data, in-depth interviews which will collect mainly qualitative data, and self-reported behaviours, which will collect mainly quantitative data.

An online survey has been emailed to all staff and students in De Montfort University, that is around 20.000 students and 3.000 staff. The survey covers different aspects of pro-environmental behaviours and attitudes: the awareness and concerns for climate change at the local and global level, the sense of responsibility for energy use during the time people spend at the University, and the sense of motivation for changing behaviour towards a pro-environmental model. The survey also interrogates the current pattern of energy use of staff and students during the time they spend at DMU, asking detailed questions about the appliances they use and the amount of time of use, to create a baseline to measure the outcome of the study against. Moreover, because the overall participatory process will be happening on social media, it also asks questions about the awareness and use of Social Network Sites, including the use via mobile phones.

The results of the pre-study will be used as a comparison to a follow up survey that will be performed after the intervention.

Recruiting groups of participants for in-depth interviewing and monitoring. The pre-survey will also be used as a recruiting tool for participants. Three groups of participants, made of 10

participants each, will be sought. The ideal participants' groups will be composed of both staff and students (graduates and undergraduates) and from people that have different backgrounds and levels of experience.

The selected participants will be engaged in in-depth interviews and asked to monitor and report their behaviour before and after the interventions. The evaluation will be organised in a two-steps process: in-depth interviews and behaviour monitoring in particular offices (for one or two weeks) will be carried out before and after the social media campaign that will run between three and six months (June to August/December 2012). During the interviews they will be asked to discuss the issues of energy use in a non-domestic building, on the problem of responsibilities of use in this context and will be asked to produce innovative ideas about how they would resolve these problems. They will also be asked questions that will reveal their sense of 'environmental morale', e.g. the New Environmental Paradigm (Dunlap et al. 2000), which is closely connected to environmental citizenship. The participants will be invited to become actively engaged in the public participation process going on, on Twitter and Facebook.

Documenting pre-test levels of energy use in selected university buildings. Gas and electricity consumption data is being measured on a half-hourly basis through a permanent automatic meter reading in De Montfort University. These data will be set up to provide on-going energy feedback on social media platforms. Feedback about energy use will be integrated in the social media campaign every Monday.

During Intervention

Interventions using participatory approaches and action research methodologies. The three to six month social media campaign is intended to develop as a bi-directional process; Twitter and Facebook will be used with the double intention of providing information to DMU users, but also of nurturing the creation of a public participation process, in the sense that people will have a public place where to talk about sustainability, to exchange ideas and advices on how to be green, and to point out to the sustainability office any concerns or inefficiencies around the university. The aim of the Twitter account and of the Facebook page is to generate a genuine engagement process about sustainability between the users of DMU with the ambition that this will lead not only to a change in their attitudes, but also in the up-taking of practical pro-environmental actions.

Social media campaign design. The campaign will be organised on thematic days, following the example of other successful initiatives: Monday is 'Energy day' and used for giving feedback. The energy consumption of DMU's buildings will be shown compared to the same period of the last year with the intention of keeping people up-to-date and raise awareness. Tuesday is 'Health and well being day'. Wednesday is 'Advice day': SustainableDMU sends out suggestions about how to save energy in the workplace and at home. Interaction with the followers is sought asking them to give their advice and/or to share their daily action to save energy. Thursday is 'Transport day'. Friday is 'Research day': updates on current research into sustainability in DMU and other Universities will be sent out. Friday is also an important day for saving energy during the weekend. Therefore around 4 pm messages will be sent to remind people to switch off computers, lights, and other electrical appliances before going home.

Application of public participation theory. In parallel with the social media campaign, workshops will be held with the participants recruited with the online survey. They will engage around the issues of sustainability, energy use in institutional building, and social media use and impact, but they will be free to decide their own agenda, as this is one of the important points of public participation theory. They will be asked to meet on a regularly basis, once a month during the 3 months intervention or once every two months for the 6 months intervention. The communication

between the participants and the research team will mainly happen through the Internet. Email will be sent to invite people at the focus group and to remind them. However, the use of Twitter as a means of communication and exchange of information will be encouraged, with the aim of creating a place to share updates on the project, interact and to easily find information. Data about interaction of participants on social media will be recorded.

Application of action research methodology. The characteristics of action research are the foundations of the present study. Therefore each step of research will be organised to follow its characteristics. This means that both the research questions and the methods could modify during the intervention. In the social media campaign, applying an action research methodology would mean understanding which topics people are more interested in and would more engage around and let the campaign focus more around those issues than others. In the participatory process, applying action research methodology would mean collecting ideas and advices from participants about how they would confront the issues of energy use in a non-domestic building, and then applying those ideas in a real context (e.g. selected buildings or offices).

Tracking of energy, social media interactions and responses to interactions. During the intervention stage, the researchers will continually track social media metrics and content as described above. In addition, energy use monitoring both campus-wide and in specific buildings will be conducted.

After Intervention

Analysis of data and reporting results. The results will be both quantitative (reduction in building energy use; social media participation measures; and surveys measuring change in environmental citizenship measures) and qualitative (social media content analysis, in-depth interviews, tracking and description of interaction between researcher and researched).

The evaluation analyse if a change in attitudes and behaviour has been made. Therefore a triangulation of the different collected data and both of the qualitative and quantitative data will be performed. For example, if participants affirm their attitudes towards the environment have changed during the intervention, consequent results will be sought in their self-reported behaviours.

Conclusions - Expected Outcomes

The study aims at developing a meaningful and reliable process of public engagement on social media. It aims at actively engaging as many users as possible in De Montfort University and at bringing sustainability to be one of the major issues of concern in the university's thinking and discussing. In other words, it expects to enhance the sense of environmental citizenship in the users of DMU Sustainability Office's social media vehicles. The achievement of these objectives will mean that the study have been achieved half of its stated aims.

The study also expects that the enhancement of environmental citizenship will lead pro-environmental behaviours becoming more widespread among DMU's staff and students both on campus or not. This objective will be evaluated through in-depth interviews and behaviour observation, and also through the comparison of the meter readings of 2012 with the previous year.

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