DESIGN, SUSTAINABILITY AND BEHAVIOUR CHANGE

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ABSTRACT
The Faculty of Engineering Science and the Built Environment (FESBE) has a well-established and positive reputation for high quality research, enterprise, under and post-graduate courses in the field of sustainable design and engineering. Experience of working in these areas highlighted the gap between theory and practice among staff and students however and further investigation showed that there was considerable 'room for improvement' in issues associated with sustainability around the university as a whole. Research revealed that the most successful campaigns related to sustainability are those in which the community is involved and those which enable audience members to appreciate and / or identify with the outcomes of their activities. It was therefore appropriate to develop a student design project that helped to turn theory into practice by raising awareness of sustainability and encouraging more sustainable behaviour around the university, which is particularly timely because 2005 – 2014 is the UN Decade of Education for Sustainable Development. This paper details the context of the project, the project itself and the various anticipated and unanticipated outcomes of the project.

Keywords: Design, sustainability, behaviour change

1   INTRODUCTION AND CONTEXT

The now widely accepted definition of sustainability as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs' was first introduced in the so-called Bruntland report produced by the World Commission on Environment and Development in 1987 [1], [2]. Concern about industrialisation, its associated values and effects on the environment and society however were discussed long before then in creative circles by visionaries such as John Ruskin and William Morris [3] and engineers and designers including Richard Buckminster Fuller [4]. Despite the numerous debates, propositions and manifestos there was little evidence of change in attitude and practice in industry or the design profession and consequently in 1972 the designer Victor Papanek stated that "There are few professions more harmful than industrial design, but only a very few by creating whole new species of permanent garbage to clutter up the landscape, and by choosing materials and processes that pollute the air we breath, designers have become a dangerous breed. In this age of mass production when everything must be planned and designed, design has become the most powerful tool with which man shapes his tools and environments (and, by extension, society and himself). This demands high social and moral responsibility from the designer." [5].

Since then concern about environmental degradation in particular has encouraged the inclusion of sustainable design and engineering-related study in the course curricula of various academic institutions including those in the Faculty of Engineering Science and the Built Environment (FESBE) at London South Bank University (LSBU). Consequently graduates from these courses have an established and positive reputation as do many academic and research staff who are also engaged in activities in the field. Examples of student projects include 'traditional' and renewable energy studies and the design, manufacture and utilisation of renewable technologies (e.g. wind turbines, electro-mechanical (wind-up) toothbrushes, piezo-electric chargers for mobile phones and 'walkie-talkies' and solar-powered garden watering system and model cars). The Mad Dog project, a staff-student venture, involved the design, construction and racing of full-size solar-powered cars in Australia, the USA, and Japan while other research and enterprise-linked projects involve carbon reduction and energy efficiency in the built environment, energy efficient cooling and refrigeration systems and thin film

photo-voltaic technologies. This work is all positive and can be seen as contributing "to the changes required for a low carbon economy and a society which is low in the use of energy and raw materials and high in terms of intellectual capital and creativity"" as advocated by Centre for Sustainable Futures [6].

In addition to environmental / ecological considerations sustainability embraces social and economic issues and while the emphasis of the above examples is the environment, student-focused, research and enterprise projects also involve economic and social factors. For example post-graduate courses include the study of energy policy and economics, while the design courses incorporate inclusive / universal design projects in which students develop concept products and services that can be used by all consumers including older and/or less able and disabled consumers. These projects are all examples of "education *about* sustainability", an approach that assumes that "sustainable policy changes should derive from increased knowledge of the subject" [7]. This is not always the case however: even though numerous design and engineering students are engaged in course and project work that relates directly to the three principle values of sustainability (and therefore they are more informed than students on other courses), they do not necessarily transfer what they have learnt about sustainability to other parts of the course; anecdotal evidence also suggests that they are not transferring this knowledge to their personal lives.

These students are not unique; in fact the Kolmuss and Agyeman [2002] imply that this is common and state that "only a small fraction of pro-environmental behaviour can be directly linked to environmental knowledge and environmental awareness". As yet there is no definitive explanation why there is a gap between the possession of this type of knowledge and awareness, and the display of pro-environmental behaviour; however a range of factors have been shown to influence this type of behaviour including gender and level of education [8] and home environments and background. In the case of recycling for example it been found that poor quality or inconvenient services [9], poverty, social deprivation and mobility problems are barriers to participation in sustainability-related activities like recycling schemes [10]. This is particularly relevant because many students at LSBU come from some of the poorest boroughs in London where recycling rates are also comparatively poor [11] and therefore it is probable that there is not a culture of sustainable behaviour.

These factors highlight the need to educate students "*for* sustainability", the impact of which should be far reaching because it "can be seen as teaching towards changes in values and behaviour" [12], [13]. This approach also facilitates sustainable decision making at various levels ranging from the individual and local to the collective and global and seeks to bridge the gap between theory and practice [14], which will of course involve behaviour change.

It is acknowledged that changing behaviour can be problematic but there are examples of good practice and success in relation to sustainability. McKenzie-Mohr [2000] argues that community-based social marketing – CBSM - (which uses psychological knowledge to encourage behaviour change) is more successful in promoting sustainable behaviour than purely information-intensive campaigns [15]; however CBSM requires specialist knowledge and expertise and is more time and resource intensive than information campaigns that are initiated without community engagement because the strategies are discreet to each project. In 2006 Davis et al published the results of a study about the projected and actual recycling habits of a number of residents in West Oxfordshire, which was intended to assist local authorities (and other agencies) who were developing recycling campaigns and associated promotional material. This research showed that the subjects responded positively to and changed their behaviour as they became more aware of the "outcomes of recycling"" and developed "an active concern for the environment" [16].

The product design courses have included sustainable design for many years but, as previously stated, awareness of and knowledge about this subject does not necessarily mean that the students on these courses turn theory in to practice. A design project was developed in an attempt to address this issue.

2   AIMS AND OBJECTIVES

The project aims and objectives were straightforward and in addition to developing knowledge about graphic design and desktop publishing software and improving common and transferable skills, the specific intent of the project was to facilitate "education *for*" sustainability:

- Increase product design students' awareness of issues related to sustainability
- Encourage students (and staff) to turn theory in to practice and behave in more sustainable manner

3   THE PROJECT

The first project brief (2008) required each student to design two A3 posters, the graphic style of which was related and could be developed into a visual 'brand'; the content of each poster had to promote criteria such as energy saving, reducing carbon emissions, and/or recycling. The project was included in the first year of the course to ensure that all students engaged with the concept of sustainability as early as possible and to demonstrate that the concept should be included in their design work by default. As usual the work was assessed by the academic who taught the unit but in this case the project was also run as a competition which was judged by individuals who are not directly involved with the course, namely a university facilities manager, the chair of the university Sustainable Development Group, and two practicing designers. This gave the students the opportunity to work for 'external clients' and motivated them to produce design work of high standard. In order to write the copy and generate design concepts for the posters they first had to find out about the aforementioned factors.

After the poster display, judging and feedback sessions, in addition to the winning design, several other posters with striking imagery and messages were selected and developed to create a collection of posters [see Figures 1,2 and 3]. These were printed and displayed around the university campus at the beginning of the new academic year and at the official launch of the university Sustainable Development Group. Digital versions of the posters was made available to download via the Sustainable Development Group website [17]

Figures 1, 2 and 3. Sample posters, June 2008

The second version of the project (which was launched in spring 2009) was group-based. The brief was initiated by the LSBU People and Planet group, who provided written content and asked the students to design a collection of 8 posters. Again the competition was judged by external professionals and the winning posters were printed, displayed around the campus; digital versions were again posted on the SDG website [see Figures 4, 5, and 6].

Figures 4, 5 and 6. Sample posters, June 2009

4 ANTICIPATED AND UNANTICIPATED OUTCOMES

4.1 General outcomes

In both cases the graphic style of the posters was very different to that of the corporate publicity material and therefore distinctive and the initial response to the posters inside the University was very positive. The posters were also well-received outside the University; for example they were commended and promoted by energyXchange, a European Union programme that "identifies and promotes successful energy awareness materials and initiatives…The aim is that other organisations can learn from already successful initiatives' [18]. The significance of the posters as an awareness raising initiative also contributed to an improvement of 18 places up the national People and Planet Green League table making LSBU joint 3rd in London [19]. These acknowledgements are positive publicity for the University as a whole and a very valuable addition to the design students' CVs.

Since the posters were displayed around the University campus there have been several changes in facilities and their management; these include the employment of an Energy and Environment manager, the installation of more energy efficient lighting systems and the widespread distribution of recycling bins. Consequently there has been a concurrent increase in the level of recycling and a decrease in the level of waste sent to landfill and for energy recovery at a local CHP plant.

4.2 Research

It is acknowledged that these changes are extremely important and positive, but they are institutional. The primary aim of this project however was to educate individual students (and staff) '*about*' and '*for*' sustainability by raising awareness and encouraging behaviour change. Eighteen months after the first set of posters was displayed and 6 months after the second set of posters was displayed a survey was conducted to ascertain whether this aim had been met. The survey was also conducted to determine whether there was any difference in the response of individual staff and students across the university (Cross Campus Survey) and the students who had been involved in the poster design project (Design Student' Survey).

4.3 Results

The surveys included a series of questions related to the content of the posters e.g. recycling, energy saving (turning lights and electrical products off), Fair-trade, water use (leaving the tap running when cleaning teeth), walking and transport. Respondents were asked about the extent to which they carried out these activities (100%, 75% 50%, 25% 0% of the time) *before* and *after* reading / designing the posters and whether the posters had encouraged them to change their lifestyle in any way.

The results are summarised as follows: the demographics of the two groups of respondents differed: the majority of Design Students who responded were 18 and 21 year old males while most of the Cross Campus survey respondents were female staff between 41-50 years old. Nevertheless the response to these and other general questions from the two groups was similar: 85% of respondents in

the Cross Campus survey like the posters and 77% believe that they were a good means of disseminating information about sustainability; 75% of this group and 69% of Design Students believe that we should run similar projects in the future. However the response to questions about behaviour and lifestyle differed.

The results revealed that although the posters had *not* encouraged any significant behaviour change by Cross Campus respondents, rather than being negative this can be seen as positive because the majority of these respondents explained that they were already have a 'low impact' lifestyle and/or are living in as sustainable a way as feasible. The results also showed that prior to reading the posters this group of respondents described their level of knowledge of sustainability as 'reasonable'. This level of knowledge was higher than that of the majority of Design students, who declared that, prior to undertaking the project, they only knew 'a little' about sustainability. Like the majority of respondents to the Cross Campus survey 50% of this student group also stated that they had not changed their behaviour or lifestyle because they were 'already living in a sustainable manner'. However the other half of the group commented that they had changed their lifestyle in response to the content of the posters; this was endorsed by the statistical results which revealed a marked difference in behaviour *before* and *after* the group of Design students engaged in the project: for example on average there has been a 20% increase in the number of students who state that they now switch off lights and other electrical appliances 100% of the time. There has also been a definite increase (>15%) in the number of students who have reduced their use of water by turning off taps when cleaning teeth and washing up. In fact this group state that they have made positive changes 75% of the time in all categories.

5   CONCLUSION AND DISCUSSION

The project has proved to be a valuable vehicle for teaching students about the principles of sustainability and the students who have subsequently undertaken sustainable design project work have done so from an informed position. Consequently their output has been of a higher standard than students in earlier cohorts. The project was so well-received by some students that they formed a Student Union society (Design Junkies) who reuse and recycle materials to make products. The fact that the project is a competition and receives attention from individuals outside the course has also encouraged some students to produce work of a higher and more professional standard than that produced for other assignments. Furthermore the high level publicity and positive response to the posters inside and outside the University has also helped some rather shy students to become more confident. These factors alone indicate that the same or similar projects should be run in the future.

It is acknowledged that the results of the survey are anecdotal and that there is often a difference between what people say they do and what they actually do. In one particular instance however the response to the question is reflected in behaviour around the campus: in this instance all respondents stated that they recycle glass, plastics, paper and cans significantly more now than they did before the posters were designed and exhibited. While recycling has been facilitated by the introduction of dedicated bins students and staff are not obliged to recycle; nevertheless the quantity and mass of materials deposited in these bins is continually increasing. It is therefore fair to assume that the responses to the other survey questions also reflect actual behaviour.

The results of the Cross Campus Survey are skewed because a significant majority of respondents revealed that already had an active interest in and are trying to live in a comparatively sustainable manner; therefore it was not possible to learn from the survey whether the posters have encouraged individuals who do not live in a sustainable manner to change their behaviour. The results of the Design students' survey are more informative however. The respondents did not have extensive knowledge of sustainability before they engaged in this particular project but it encouraged deep learning. The project enabled the students to engage with the subject matter on a comparatively personal level which in turn encouraged behaviour change. It is therefore fair to say that the project and the posters have helped to educate the students both *about* and *for* sustainability and it is hoped that the students retain this knowledge and that their change in behaviour is long term.

REFERENCES

[1]   WCED (1987) Report of the World Commission on Environment and Development: Our Common Future Retrieved 3 August 2009 from http://www.un-documents.net/wced-ocf.htm

[2] Pavlova, M., (2009) Introduction to Special Edition of the International Journal of Technology and Design Education Volume 19, Number 2 / April, 2009 Int J Technol Des Educ (2009) 19:105–107

[3] Pevsner N. (1960) Pioneers of Modern Design, Penguin Books, London.

[4] Bayley S. (ed) (1985) The Conran Directory of Design, Octopus Conran, London.

[5] Papanek, V., (1972) Design for the Real World, Thames & Hudson; 1st edition London

[6] Sterling, S., (2005) Sustainable literacy: skills for living well into the future in Ethos Issue 9.

[7] Pitt, J. and Lubben, F., The social agenda of education for sustainable development within design & technology: the case of the Sustainable Design Award Int J Technol Des Educ (2009) 19:167–186. Retrieved 3 August 2009 from http://csf.plymouth.ac.uk/files/sterlingFull.html.txt

[8] Kolmuss, A. and Agyeman, J. (2002) Mind the Gap: why do people act environmentally and what are the barriers to pro-environmental behaviour? Environmental Education Research; Aug2002, Vol. 8 Issue 3, p239-260, 22p

[9] GLA (Greater London Authority) (2001) Rewarding Recycling; An Assembly investigation into barriers to greater recycling in London Retrieved 3 August 2009 from

[10] Waste Watch (1997) Estates Based Recycling in the UK; A national survey of recycling on socially owned housing estate. Part of the Waste Watch Wasted Opportunities Initiative. Retrieved 3 August 2009 from http://www.wasteonline.org.uk/resources/WasteWatch/EstatesBasedRecyclingUK.pdf

[11] Capital Waste Facts (2009) Dry Recycling – 2007/08 performance. Retrieved 3 August 2009 from http://www.capitalwastefacts.com/Data/HeadlineDataforLondon/DryRecycling200708 performance/tabid/222/Default.aspx

[12] Bonnett, M. (2002). Education for sustainability as a frame of mind. Environmental Education Research, 8(1), 9–20. doi:10.1080/13504620120109619.

[13] Pitt, J. and Lubben, F., The social agenda of education for sustainable development within design & technology: the case of the Sustainable Design Award Int J Technol Des Educ (2009) 19:167–186. Retrieved 3 August 2009 from http://csf.plymouth.ac.uk/files/sterlingFull.html.txt

[14] Dawe, G. Jucker, R and Martin, S. (2006) (2006) Sustainable Development in Higher Education-Current Practice and Future Developments; A report for the Higher Education Academy. Retrieved 3 August 2009 from http://www.heacademy.ac.uk/assets/York/documents/ourwork/tla/sustainability/sustdevinHEfinal report.pdf

[15] McKenzie-Mohr D. (2000) Fostering sustainable behaviour through community-based social marketing. Am Psychol. 2000 May;55(5):531-7

[16] Davis, G., Phillips, P.S., Read, A.D. and Iida, Y. (2006) Demonstrating the need for the development of internal research capacity: Understanding recycling participation using the Theory of Planned Behaviour in West Oxfordshire, UK Resources, Conservation and Recycling Volume 46, Issue 2, February 2006, Pages 115-127

[17] Sustainable Development Group, London South Bank University Sustainability posters Retrieved 4 March 2010 from http://www1.lsbu.ac.uk/about/sustainabilityposters.shtml

[18] Consulteco Ltd., (2009) EnergyXChange - A world of resources to build energy awareness. Retrieved 3 August 2009 from http://www.energyxchange.eu/en/index.php

[19] People and Planet, (2009) Green League Tables. Retrieved 3 August 2009 from http://peopleandplanet.org/green-league-2009