Effective Environmental Education Campaigns
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Introduction

This document reports original and highly-significant research, offering a rich and complex analysis of relationships between environmental values, attitudes, knowledge and behaviour. With the recent release of the NSW EPA report *Who Cares about the Environment? 2000*, widespread recognition of the limits of purely structural approaches, and the concomitant value of source control solutions to stormwater pollution, this report offers crucial insights into policy and planning imperatives. Moreover, it does so from a uniquely trans-disciplinary perspective, designing and developing environmental education initiatives using physical science (i.e. the identification and quantification of physical pollutants) and social science (i.e. social research and behavioural analysis).

The project was funded by the NSW Stormwater Trust to evaluate the effectiveness of education campaigns and source control on urban stormwater quality. This research has not previously been undertaken in Australia and the project has developed and tested a number of social science methodologies and theories around the importance and value of community attitudes and behavioural change.

Waverley Council and the University of NSW (UNSW) Schools of Social Science and Policy and Civil and Environmental Engineering jointly developed the project which was awarded to Waverley Council in 1999 under Stage 2 of the NSW Stormwater Trust Grants.

This report integrates the findings from social and physical scientific research conducted to assess the effectiveness of environmental education campaigns. It has been written in response to a request from Waverley Council in August 2002.

Broadly, the project was divided into three components:

1. Development and implementation of targeted stormwater education campaigns. This part of the program relied on comprehensive pre and post intervention social surveys and was managed by the UNSW School of Social Science and Policy.

2. Physical monitoring of pollutants within the catchment. This involved a range of techniques.

   a) developing and applying observational monitoring techniques to determine the state of the catchment, as undertaken by Waverley Council and UNSW School of Social Science and Policy;

   b) measuring the quantities of gross pollutants captured by the structural devices (carried out by Waverley Council); and

   c) quantifying contaminant loads on the road surface via chemical monitoring through previously developed street vacuuming techniques, as undertaken by UNSW School of Civil and Environmental Engineering.

3. Installation of a gross pollution control device at the pipe end of three of the four study catchments: Oceanview Avenue, Diamond Bay; Hewlett Street, Bronte; and

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1 The UNSW School of Social Science and Policy project team subsequently joined Elton Consulting.
Tamarama Beach. Installation was managed by Waverley Council. Additional funding was obtained from the Federal Government’s Coast and Clean Seas Program for the device at Tamarama.

Within these three components the project sought to address four objectives:

1. To involve the community in stormwater pollution reduction strategies and to evaluate the effectiveness of these strategies on specific groups, land uses and activities.

2. To provide quantitative information on the effectiveness of education programs aimed at residential and commercial stakeholders.

3. To develop innovative community education strategies that other councils may adopt.

4. To assess the costs/benefits of installing stormwater pollution control devices in small residential catchments.

For the purposes of this study, the community was broadly defined to include those that live, work, use or visit the catchments.

Methodology

Four stormwater catchments or sub-catchments were selected across the Waverley Local Government Area (LGA). They are located within the suburbs of Dover Heights, Bronte, Charing Cross, and Bondi. The selection of these areas was based on clearly defined stormwater catchment, land use and demographic characteristics (insofar as they were representative of the Waverley LGA). The roads chosen within these sites to collect physical data were considered to be ‘representative of typical commercial and residential roads within the catchments’ (Ball n.d.:17).

The methodology is designed around a pre and post-test model.

- Pre-test - developing evidence base, establishing baseline measures, identifying key campaign messages and strategies;
- Intervention - conducting the community education campaign;
- Post-test - assessing education impacts and evaluating campaign effectiveness.

The project was additionally designed using control and intervention sites.

Dover Heights and Bronte were selected as intervention sites to test community education strategies with residents. Charing Cross acted as the intervention site for an education campaign with small businesses. The control site for both residential and commercial campaigns (that is, the area where no campaigns were conducted) was Bondi. The purpose of the control site is to determine if demonstrated change has resulted from the education campaign. It allows the project to compare the degree of change between the control and intervention sites, isolate differences, and statistically test them.
Working with the community – the residential campaigns

Community education campaigns were developed around extensively researched demographics, environmental values and attitudes, communication preferences, and levels of knowledge. They were targeted to locality-specific information and characteristics, and were linked by consistent messages around community values and attachments. Community education materials included a series of catchment-specific postcards and directly addressed letters, sent to residents across the local area. Some were also directed at professional gardeners and maintenance staff. A separate campaign targeted contract gardeners with a mail-out and an article in a professional newsletter. In addition, activities in Bronte involved school children and a street party.

Working with small business – the commercial campaign

As with the campaign above, social surveys were used to identify key messages, assess levels of knowledge, attitudes and behaviour, and suggest communication preferences. The campaign concentrated on a series of small scale activities, with information kits, directly-addressed letters, locality-specific posters and postcards. These were all supported by a series of walk-around visits to local businesses in Charing Cross, accompanied at times by representatives from Council. Council also initiated a regulatory approach with 3 targeted audits.

Physical monitoring

Physical data was collected by vacuuming sections of the chosen road in each of the catchments. The sample collected was then analysed physically, by sifting it into different sized particles, and chemically.

Observational auditing was also undertaken to inform the design and development of the education campaigns. Observational audits described potential and actual behaviours contributing to stormwater pollution. As a tool for quantitative data collection, this approach has obvious limitations, however the audits provided valuable information in terms of correlating reported and perceived behaviours.

Observational audits are systematically structured ‘observations’ of places, people and practices. The emphasis is on profiling practices which may impact on water quality, identifying who is involved, and the context in which negative practices occur. Observational audits supplement pre-existing information, highlighting audiences and potential behaviours to target in an education campaign while analysing the context in which they occur.
Findings

The residential campaign

The community education strategies
Recall of the community education campaigns was positive across the two study areas of Diamond Bay and Bronte.

The locally-targeted postcards and letters were most commonly remembered in both intervention areas.

The street party and letter-boxed flyers featured in descriptions of campaign activities by Bronte respondents, as did the project involvement of UNSW.

The Bronte street party was described as an effective way to enhance community values, norms and relationships. This encouraged residents to particularly engage with education messages.

The majority of Bronte respondents reported the campaigns were effective, although only a small number subsequently described why. The campaigns were perceived to be effective because they increased awareness and educated people, they were locally targeted, they influenced people to change their behaviour, and they were different and unusual.

Less than half the respondents from Diamond Bay offered a view on the effectiveness of the campaigns. A small number said they were effective as they raised awareness and caused them to change their behaviour.

Changes as a result of community education
Some major shifts in attitudes and values appear to have occurred between the pre and post-test surveys.

We asked people to rate a series of statements to assess environmental values and attitudes. They are used to locate respondents along a continuum of environmental values and attitudes, to determine the extent to which individuals identify with their own impacts, responsibility and willingness to change. Respondents with ‘internalised’ values identify their own impacts, take responsibility for addressing them, and are motivated to change. Respondents with ‘externalised’ values perceive the causes and solutions to be the responsibility of others.

Responses showed a shift away from externalised attitudes and values (eg. the experts will solve the problems, and nothing I can do will help) towards a neutral middle ground.

The ranking of environmental issues of importance remained consistent across pre and post-test surveys, with respondents nominating air pollution first, followed by the pollution of beaches and other waterways, and litter and dumped rubbish.
Respondents in Bronte rated the pollution of beaches and other waterways as significantly more important than did respondents from Diamond Bay and Bondi. Litter and dumped rubbish remained a significant issue of concern in Diamond Bay.

Sewerage was nominated as a key pollutant of oceans and other waterways in pre-test results, whereas stormwater pollution and litter and dumped rubbish dominated post-test. After the community education campaigns, sewerage had diminished in importance for respondents in Diamond Bay and Bronte, although it remained a key issue for respondents in Bondi. Stormwater pollution and litter and dumped rubbish consistently dominated responses across Diamond Bay and Bronte, almost totally excluding other possible causes.

Pre-test responses nominated builders as the most responsible for causing water pollution, followed by industry and the community. After the community education campaigns, industry was regarded as the most responsible, followed by individuals and the community. This suggests a shift away from externalised notions of responsibility towards internalised and collective notions of responsibility.

Knowledge increased across all but one of the questions regarding potential pollutants in stormwater.

The potential effects of soil, sand and silt in the stormwater system was not clearly understood, and this is particularly noteworthy given this was a feature of all of the campaign material. It is possible that people do not perceive these materials to be as harmful as they perceive detergents from car washes and animal faeces to be.

Pre-test levels of knowledge were relatively high, but rose further at the post-test.

Levels of knowledge particularly increased in Diamond Bay and Bronte. This suggests that knowledge improved as a result of the community education campaigns.

The community education campaign focused on key messages and target behaviours. Post-test analysis established changes in some, albeit not all, of these practices. This may relate to issues of access and control - for example, two-thirds of respondents in the post-test survey reported they had no access to grassed areas, therefore were unable to wash their cars on grass.

Respondents with higher levels of environmental knowledge and who identified on-street car washing as contributing to stormwater pollution, were significantly more likely to wash cars less frequently. This suggests a significant relationship between knowledge and behaviour.

Post-test responses indicate increased percentages of respondents disposed of waste water down the sink in the house or on the grass outside. However, increased percentages of respondents also reported they disposed of water down the stormwater drain. Comments written on the survey forms by respondents noted that many had reduced the amount of detergent used to wash the car, or else had...
stopped using it altogether. If respondents felt they had removed the pollutants from waste water, they may have felt justified in disposing of it down the stormwater drain.

There were overall improvements in other practices targeted by the community education campaigns. Respondents increasingly collected up organic matter, cleared leaf litter from street gutters, and disposed of them by composting. Moreover, there was a decrease in the percentages of respondents who regularly hosed down cement areas.

Overall, there was a statistically significant relationship established between attitudes and knowledge.

Overall environmental knowledge increased after the community education campaigns, with respondents who internalised responsibility scoring higher on the total environmental knowledge scale than did those who externalised responsibility.

There was a statistically significant relationship between attitudes and environmental behaviour after the community education campaign. Moreover, there has been a statistically significantly greater post-test shift in the relationship between internalised and externalised attitudes and environmental behaviour.

Lastly, those identified with internalised attitudes and values have scored significantly higher on environmental behaviour.

**The commercial campaign**

Business in Charing Cross became significantly more concerned about the impact they had on the environment, than did those in Bondi (where no campaign was conducted). Charing Cross businesses also became significantly more willing to change business practices to improve water quality.

Ninety-one percent of businesses in Charing Cross correctly identified stormwater pollutants after the campaign, compared with 70 percent of those in Bondi.

Forty-one percent of businesses reported changing their behaviour after the education campaign. These changes involved practices targeted in campaign messages, such as sweeping up (not hosing down), using appropriate wash bays and bunded areas, and using appropriate waste and water disposal methods.

Businesses in Charing Cross reported the most effective parts of the campaign were the personal contact and visits, the posters, and directly-addressed letter.

**Physical Monitoring**

The physical monitoring report found that there were ‘no statistically significant changes to the availability of stormwater borne contaminants prior to and post the community education campaign’.
One of the aims of this project was to assess the value of physical monitoring for a project which has a short time frame and which is preventative in direction. It was difficult for physical monitoring to take sufficient account of the many externalities associated with dustfall and vehicle movements that would complicate any direct relationship between community response (to the education program) and pre and post pollutant levels. This suggests that the physical monitoring is not adequate for measuring the effectiveness of environmental education which occurs over a 12 month period. The use of observational and physical audits provides a more useful tool for this purpose.

Lessons Learned

• The critical importance of knowing the target audience, to direct education strategies and identify campaign messages.

• Physical monitoring activities inform the content of the education interventions but they cannot be used to measure the impacts of the education campaigns.

• The design, implementation and evaluation of the education across the three catchments cost less than one of the three GPTs that were installed as part of the project.

• The maintenance of environmental education is important, and the cost of maintaining the education in the three catchments is less than the maintenance of the GPTs.

• That well designed and carefully targeted environmental education is more cost effective in the short and long term than the installation of GPTs.

• The importance of evaluation - measuring what is done and how and what has changed in terms of environmental knowledge, attitudes, values and behaviour.

Conclusion

This was an innovative project. There are few examples of inter-disciplinary approaches to environmental education in which the physical science aspects (ie the identification and quantification of physical pollutants) and the social science aspects (ie the behaviours that cause the pollution) are considered.

Environmental campaigns are generally designed and implemented based on little or no data about the behavioural responses, attitudes and values of their target audience. Research suggests that despite increasing awareness of and concern about environmental issues, changes in behaviour may not necessarily follow.

Of the few studies of behavioural change in relation to polluting activities there is a clear gap in understanding as to whether behavioural change occurs as a result of increased knowledge and changes in attitudes and values; or whether there are other factors at work. This project examined the factors which affect behaviour impacting on stormwater pollution specifically.
The results of the foregoing establish that environmental attitudes, values, knowledge and behaviour changed as a result of education interventions.

The project methodology, in terms of seeking to measure changes in community behaviour through physical testing of pollutants, has proven to be inappropriate. Much longer time frames would be required, as well as the ability to exclude external factors (such as regular road use), for physical monitoring to find reduced levels of stormwater pollutants following education campaigns. Nonetheless, the social science methods used in this project have demonstrated positive change.

Key features for successful campaigns include locality-specific education messages, strategies and resources, underpinned by research regarding community values, attitudes, concerns and communication preferences.

The full reports are essential reading for all government bodies, environmental organisations, researchers and communicators involved in environmental education at any level.