Environmental Awareness in the Workplace: An Evaluation Study

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A B S T R A C T

This study examined the effects of Sydney Water's work based environmental education program, the CARE Update, on the knowledge, attitudes, beliefs and reported behaviour of Sydney Water Customer Service Officers. A paired sample of eighty Customer Service Officers were surveyed by a combination of questionnaire and interview techniques. A comparison was made with a matched sample from the general community.
Customer Service Officers who had attended the CARE Update course were more likely to support the attitudes and beliefs embodied in the *New Environmental Paradigm* when compared with officers who had not attended the course and with the matched sample from the general community. However, staff who attended the course were no more knowledgeable on a number of key aspects of their job related responsibilities for environmental protection and were no more likely to report changes in their behaviours for environmental protection, either at work or at home, than were other officers who had not attended the course.

The importance of work-based environmental education programs as a means of helping to achieve an ecologically sustainable society has been argued by a number of authors (Henning 1984, National Institute of Adult and Continuing Education (NIACE) 1993, Victorian Environmental Education Council (VEEC) 1992). Henning's (1984) highlighting of the importance of training for personnel involved in natural resource management is exemplified in his statement that "much of the success or failure of the World Conservation Strategy will depend on government decision makers and their exposure to environmental values and considerations".

Appropriate education is seen to be essential for implementing responsible work practices; however Henning (1984) identified work-based environmental education as a vital but neglected area of environmental education. Awareness of environmental issues may be weaker among adults, particularly older adults, than among young people (NIACE, 1993; Environment Protection Authority, 1994), indicating a need for environmental education of adults, perhaps especially those responsible for leadership in and communication of decisions affecting the environment.

In 1990 Sydney Water, then the Water Board, recognised its responsibility towards fostering staff awareness of their environmental responsibilities by introducing the CARE — Cooperation, Awareness and Responsibility for the Environment—program (Award Human Performance Consulting 1990). This paper reports on an evaluation study conducted in 1995 as part of a Masters in Natural Resource Management designed to determine the effectiveness of the Sydney Water CARE Update program, as a means of increasing staff support for environmental protection.

The CARE program

The CARE program is an environmental education program for all Sydney Water staff. The original general awareness course, CARE 1, was attended by all staff in 1990-93 while particular staff groups also attended additional specialist courses. The CARE 1 course was a half-day course emphasising individuals' roles within the organisation in protecting the environment. The course focused particularly on the newly introduced Environmental Offences and Penalties Act and its implications for staff and the organisation. In mid 1994 the 'CARE Update' program was introduced as a refresher and update to the CARE 1 course.

The identified objectives of the CARE Update program were (G. Lynch & N. Turkington pers. comm.):

- to increase general environmental awareness
- to increase participants' knowledge of Sydney Water's and their own job related responsibilities for environmental protection
- to influence participants' attitudes and beliefs towards being more supportive of environmental protection
- to make participants aware of the role of personal action in improving the environment and to help them to find ways in which they can make a difference

The half day 'CARE Update' program included:

- a summary of the original CARE 1 program
- an overview of Australia's history of neglectful behaviour towards the environment and the resultant environmental crises facing society today
- a focus on the cumulative effect of individual actions, including human creation of waste, energy overuse, overuse of office consumables as well as the overuse of fuels for transport

https://doi.org/10.1017/S0814062600004201 Published online by Cambridge University Press

- a review of outcomes of prosecutions conducted by the EPA under the Environmental Offences and Penalties Act
- a discussion on how each individual could contribute to environmental protection in their job

The CARE Update program used a group lecture and discussion style approach. Groups were kept small—less than 15 people—and questions such as "Do you believe we have an environmental crisis?" and "What do you think we should do about it?' were used to engage participants in discussion about local and global environmental issues. A dramatic video was used showing a fictional incident in which industrial spillage polluted a stream acting as a trigger to generate discussion on the responsibility of each worker for environmental protection. The program was flexible within the outline detailed above to allow for different levels of interest and expertise in participants.

The study

Aims

This study was designed to determine the effects of attending the CARE Update program on participants' knowledge of job-related responsibilities for environmental protection, environmental attitudes and beliefs, and their perceptions of the extent to which they were taking actions associated with environmental responsibility.

Method

The study surveyed 80 Sydney Water Customer Service Officers (CSOs) through written questionnaire. In addition, 12 CSOs were interviewed. CSOs were staff who worked in the business offices and therefore had contact with the general public on a day to day basis. CSOs communicated with the public about such matters as water restrictions. They therefore had an important informal educational role. CSOs were chosen for this study as they were the only group to have completed the CARE Update course at the time of the study.

Paired samples were used in this study as pre- and post-test information was unavailable. Forty CSOs from Northern region had completed both the CARE 1 course and the CARE Update. These became the experimental group. The control group was selected from approximately 200 CSOs, the remainder of those in the organisation. This group was matched with the experimental group by stratifying on the basis of age, gender and length of time with Sydney Water and selecting a random sample from within each cohort to match the characteristics of the experimental group.

A similarly matched sample of the responses of 40 general community respondents who had undertaken neither the CARE 1 nor the CARE Update course was drawn from the database of the EPA 1994 survey *Who cares about the environment?* for a comparison group. The EPA 1994 study surveyed a sample of the general community in New South Wales to determine their knowledge, attitudes, skill and behaviour in relation to the environment. The community group sample were matched with the Sydney Water sample on the basis of age, gender and level of education. Only the results of those respondents residing in Sydney were included in the comparison group sample.

Environmental attitudes and beliefs were probed in the written questionnaire through the inclusion of the 15 item *New Environmental Paradigm* (NEP) scale developed and validated by Dunlap and Van Liere (1978, 1992) to test the extent to which people were embracing certain pro-environmental attitudes. The NEP is associated with attitudes and beliefs towards such issues as 'limits to growth', the importance of preserving the 'balance of nature' and willingness to reject the anthropocentric notion that nature exists solely for human use. The NEP scale tackles some complex issues, asking respondents to comment on statements such as "The balance of nature is strong enough to cope with the impacts of modern industrial nations". Pilot testing demonstrated, however, that the scale was well understood and accepted by respondents.

Participants' knowledge of their job-related environmental responsibilities was explored by means of six questions adapted from a previous CARE 1 evaluation. Questions related to such issues as what staff should do if instructed to do something that may harm the environment by a supervisor and what their defences were under the Environmental Offences and Penalties Act.

Seven questions from the EPA 1994 survey exploring behaviour were used. These did not relate specifically to work-related functions but asked respondents whether they had performed actions such as taking part in a clean-up campaign. Interviews of six staff from the control and six from the experimental groups were used to probe more deeply the answers given in the written survey and to assist in interpretation of the results. A description of the statistical analysis used is contained in an appendix to this report.

Results

Attitudes and beliefs

An analysis of the extent to which groups differed in their attitudes and beliefs as measured by the NEP instrument revealed that CSOs who had attended the CARE Update course were more likely to endorse the attitudes and beliefs embodied in the *New Environmental Paradigm* than both those who had not attended the course and the comparative sample from the general community.

Table 1: Summary of analysis of variance between the three samples in relation to NEP scores

Comparison	Mean difference	Fisher PLSD
Experimental vs Control group	0.44	0.36*
Experimental vs Community group	0.518	0.358*
Control vs Community group	0.078	0.348

*Significant at 95%

The Fisher PLSD is a measure of variance between the samples.

Factor analysis identified seven factors set out in Table 2 contributing to the variance observed between NEP scores. The most significant of these were defined by the beliefs of the CSOs—both experimental and control—about the place of humans in nature (anthropocentrism versus ecocentrism) and their faith in science and technology as a means of controlling the environment (technocentrism).

Table 2: Factor summaries

Factor number	Factor description	Variance
1	Anthropocentrism/ecocentrism	30.4%
2	Technocentrism	10.1%
3	Human abuse of nature	9.2%
4	Humans as part of nature	7.9%
5	Limits to growth	6.3%
6	Balance of nature	6.0%
7	Technocentrism	5.2%

The percentage of variance indicates how much of the variation found within the sample is associated with a particular factor.

Job related responsibilities

CSOs who had attended the CARE Update course were no more knowledgeable about a number of key areas of their job related responsibilities for environmental protection than those who had not attended the course as shown in Table 3.

Table 3: Comparison of job-related knowledge possessed by experimental and control groups

Question number	% correct in experimental group	%correct in control group	Chi square test for significant difference
1	82.5	70.7	0.52
2	60	58.5	0.91
3	52.5	48.8	0.56
4	57.5	57.5	0.67
5	84.2	75.6	0.34
6	60.6	58.5	0.75

No results were significantly different.

The data in Table 4 indicate that Sydney Water CSOs who had attended the CARE Update course were no more likely to report personal behaviours for environmental protection than staff who had not attended the course.

Table 4: Comparison of percentage of respondents in experimental and control groups who reported in engaging in environmentally protective behaviours

Question number	% in experimental	% in control	Chi square test
1	85	70	0.26
2	30	32.5	0.35
3	22.5	25	0.88
4	45	37.5	0.63
5	52.5	25	0.06
6	15	20	0.59
7	5	5	0.57

No results were significantly different.

A correlation was found between knowledge of job-related environmental responsibilities and behaviours for both experimental and control groups of CSOs. No correlation was found between their attitudes, as embodied in the NEP, and their behaviours—see Table 5.

Table 5: Correlation matrix between knowledge, attitudes and behaviour

	Knowledge	Behaviour	Attitudes
Knowledge	1		
Behaviour	.326*	1	
Attitudes	.201	.091	1

*Significant at 95%

Correlation coefficients of greater than .3 are significant. Hence a significant but not strong relationship is shown between knowledge and behaviour.

https://doi.org/10.1017/S0814062600004201 Published online by Cambridge University Press

Limits to validity

The methodology of paired samples was a limitation associated with the study because of potentially uncontrollable intrinsic differences existing between the control and experimental groups. An example of this could be a difference in the extent to which the workplace culture was more or less environmentally supportive.

In previous studies (Buttel & Flinn 1976, EPA 1994) ethnic background and level of education have been found to influence environmental awareness. While these characteristics were not specifically controlled for in this evaluation there was found to be no significant difference in ethnic background or level of education between the two groups.

The necessity for the experimental group to be drawn from the northern area of Sydney could be a limitation as this area is more affluent than the southern Sydney area. However, in the EPA 1994 study household income was not found to be a significant influence on respondents' NEP scores.

Another possible limitation was the method of survey administration. In this study the NEP scale was administered through a written survey, whereas the EPA 1994 study conducted the survey using an interview technique. This difference may pose some limitations on the validity of the comparison between the groups.

Discussion

The significantly greater levels of support for the NEP among staff who had completed the CARE Update course indicated that the course probably had a positive effect on the environmental attitudes and beliefs of these participants. This is support for an ongoing Sydney Water CARE program because those who had only participated in the initial CARE program four years previously were found to have attitudes and beliefs towards the environment similar to those of the general community. Participants' reactions to the CARE Update program were exemplified by such statements as " It was relevant to the job, but also relevant to your life which is better" and "It made me think about the effects of my actions on the environment".

This similar response pattern, in regard to the NEP scale, of the control group and the EPA general community group supported the validity of the sampling procedure. The general community sample included respondents randomly selected from the entire Sydney area while, in contrast, the experimental group was necessarily restricted to northern Sydney and the control group to southern Sydney. The similar response pattern observed between the control group and the matched community sample may indicate that geographical location in Sydney was not a significant influence on environmental attitudes and beliefs in this instance. It also appears that the difference in sampling procedure between the EPA's community survey and the present study has not significantly differentiated between the response patterns revealed.

Seven factors identified as those contributing to variance in responses to the NEP instrument were compared with the principal beliefs of the *New Environmental Paradigm* (Dunlap & Van Liere 1978); it was possible to identify these factors as being grouped into six different belief systems. The finding that factor one 'anthropocentrism versus ecocentrism' accounted for 30% of the variance in the sample, indicated that respondents were strongly divided according to whether they saw humans as being 'dominant over nature' or simply 'part of nature', like other animals and plants. Factor two 'technocentrism' reflected respondents' faith in the ability of humans to control nature through science and technology. This was linked to factor seven, as was demonstrated by a correlation coefficient of 0.32 between the two factors. Factors two and seven when considered together accounted for 15% of the variance in the sample demonstrating that respondents were also strongly divided according to the extent to which they believed that science and technology had the answers to environmental problems.

Comparison of the factor analysis with an analysis of individual responses to scale items demonstrated that many respondents were responding from both an ecocentric and a technocentric view. Clearly, many respondents were not aware of any conflict between these two beliefs. This is consistent with the findings of Dunlap and Van Liere (1983) that individuals can hold two sets of conflicting beliefs without being aware that such a conflict exists. This information provides an important basis for future environmental education programs. There is a need to assist staff to clarify their beliefs about the roles of humans in nature and the abilities of humans to use science and technology to solve environmental problems.

Exploration of these two belief systems should allow Sydney Water staff to become aware of any inconsistencies in their beliefs. This may lead to staff experiencing "cognitive dissonance" (Festinger 1957) and result in their changing their beliefs to increase the consistency of those beliefs.

The time delay of almost twelve months between the conduct of the CARE Update and the post course evaluation may have contributed to the lack of significant difference in knowledge of job related environmental responsibilities between the experimental and control groups. If further research indicated that participants were familiar with the content immediately after the course this would support the need for frequent refresher courses.

The lack of statistically significant differences in reported behaviours between the Sydney Water experimental and control groups contrasts with the differences in attitudes as measured by the NEP reported above. This gives support to the findings of many researchers (Murphy et al. 1991, Prior

1992) that, although there are links between peoples' attitudes and behaviours, the possession of positive attitudes towards environmental conservation does not guarantee that people will act in predictably responsible ways. That is "we cannot assume that pro-conservation sentiments will become pro-conservation actions" (Prior 1992).

Research has shown that training people in ways to take action to improve the environment leads to a greater change in behaviours than teaching theory about environmental issues (Jordan et al. 1986, Hungerford & Volk 1990, Ramsey & Hungerford 1989). While the CARE Update course had objectives in the the areas of awareness, knowledge, attitude and action, its limited time allocation of half a day and its lecture and discussion style format worked against the achievement of these objectives.

Interviews indicated that staff were not aware of ways in which they could make changes to help protect the environment. The comment of a staff member when asked if they thought they could implement changes to help protect the environment of "Not in this job. We are just in here all day" illustrated a belief in their lack of power to implement changes. Future courses should therefore ensure strategies such as action planning are included to help participants change their behaviours.

The correlation found between participants' knowledge and behaviours indicated that increasing people's knowledge of job-related environmental issues may result in behavioural changes. This gave support to the findings of Hungerford and Volk (1990) that in depth knowledge of environmental issues is an important predictor of environmentally responsible behaviours.

In contrast, the finding of no significant correlation between attitudes and behaviours conflicts with the findings of many researchers (Murphy et al. 1991, EPA 1994) of a moderate correlation between attitudes and reported behaviours. The lack of correlation between attitudes and behaviours found in this instance may possibly be explained by the conflicting belief systems held by participants, as demonstrated through the factor analysis. Dunlap and Van Liere (1983) found that when individuals held two sets of conflicting beliefs their attitudes were less likely to predict their behaviours than if their beliefs were consistent with either the *New Environmental Paradigm* or what was referred to as the *Dominant Social Paradigm.*

Interviews conducted in this survey suggested that staff had found their work at Sydney Water to be an influence on their attitudes towards the environment; this was exemplified in the following statements: "Before I wouldn't think twice about putting oil down the sink. Now I am more aware" and "Working here has made me realise what I need to do [to improve the environment]". These findings give support to advocates of a broad based approach to environmental education, for as Malcolm (1992) emphasised "...environmental education is concerned with everything that influences environmental learning". It would be valuable to survey staff on entry to Sydney Water and to monitor their attitudes over time to determine if, when, how and why their environmental attitudes changed as a result of working for the organisation. This would provide further information on how different factors, such as peer influence and informal learning, influence environmental attitudes and assist in the development of more effective education programs.

Conclusion

The study identified three strategies in particular which would seem to be likely to increase the effectiveness of the environmental education program considered here. First, trainees need to be better assisted and empowered to develop techniques for reducing environmental impacts. Second, staff need to be encouraged to explore, challenge and recognise inconsistencies in their beliefs about the place of humans in nature and the roles of science and technology in managing nature. Third, there appears to be a need for staff to participate in frequent updates of the program.

This study was restricted to Sydney Water CSOs. A larger study, using the same evaluation technique, is currently in progress and will be considered in conjunction with the present study when determining future strategies for the program.

Environmental education in the workplace is becoming increasingly important, not only to resource management agencies, but also to consider other companies wishing to promote good relationships with the community and to improve the ways their businesses operate. The importance of work-based environmental education programs, such as the Sydney Water CARE program, in achieving an ecologically sustainable society has been argued by many authors. The part that programs such as these can play in a transition to sustainability is supported by the findings of this study that staff who have participated in such a program are more likely to accept the premises of the *New Environmental Paradigm.*

This study has highlighted the role of the workplace as an influence on people's environmental attitudes and beliefs. In addition to the formal education program, informal education and work-based cultural influences appeared to have influenced the environmental attitudes and beliefs of staff. Environmental education should not be a once in a lifetime activity but be continuous and recurrent as roles change throughout people's lives; it is clear that workplaces have the potential to be effective focuses for adult environmental education.

https://doi.org/10.1017/S0814062600004201 Published online by Cambridge University Press

Acknowledgements

I would like to acknowledge the assistance of Keith Fleming, Ken Vine and Nick Reid from the University of New England.

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Appendix: Description of statistical analysis

Statistical analysis was conducted using SPSS and QUEST software (Adams & Khoo 1993). The NEP questions yield Likert scale data that are ordinal in nature. This limits the range of statistical analyses that can be directly applied to the subjects' responses (Kerlinger 1986). In the present study the ordinal data was transformed to an interval scale of measurement on a logit scale using the Rasch latent trait analysis model (Masters and Wright 1982, Masters 1984, 1988). This allowed more powerful parametric analyses, such as ANOVA, factor analysis and regression to be used. The original data from the EPA 1994 study were also recalculated using the Rasch procedure. Non-parametric analyses were used to test for differences in knowledge and reported behaviours between the three sample groups. Total knowledge and behaviour scores for each respondent were calculated by summing the number of positive or correct responses to questions in each of these categories.

Lisa Walker is currently employed as Environmental Education Manager at Sydney Water. In this position she has responsibility for both community-based education and internal staff environmental education. She has a particular interest in the role of corporations in bringing about environmental change.