

The Effectiveness of Environmental Education: Can We Turn Tourists into 'Greenies'?

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ABSTRACT

A study which tested the effectiveness of an education programme for managing tourists was conducted at Tangalooma, Australia. At this holiday resort tourists are able to hand-feed a group of wild dolphins which visit the shallow waters adjacent to the resort's beach. The education programme, which uses techniques derived from cognitive psychology and learning theory, attempted to prompt increased enjoyment, knowledge and improved environmental attitudes, intentions and behaviour in participants. The study, which compared a control group who were not exposed to the education with an experiment group who were, found that desirable changes did occur as a result of the programme. This research provides much needed evidence that education can be an effective means of managing tourists' interaction with wildlife and the natural environment.

Received 1 April 1996; Accepted 18 November 1996
Progr. Tourism Hospit. Res. 3, 295–306 (1997)
No. of Figures: 2 No. of Tables: 6 No. of Refs: 36

Keywords: environmental education, wildlife, dolphins, interaction, Tangalooma

INTRODUCTION

One of the arguments commonly used to justify nature-based tourism is that

Contract grant sponsor: University of Queensland Postgraduate Research Scholarships

Contract grant sponsor: Royal Geographical Society of Queensland

CCC 1077-3509/97/040295-12 \$17.50

through such experiences, tourists adopt more environmentally responsible attitudes and behaviour (Russell, 1994). This argument is simplistic and is not based upon empirical research (Orams, 1994b). Studies in the educational psychology field show that it is very difficult to change human behaviour (Gudgion and Thomas, 1991), furthermore the educational programmes that are offered by tourism operators are seldom structured to do this. If the nature-based tourism industry is to make a positive contribution to the conservation of the natural environment, operators must adopt carefully designed educational programmes which incorporate lessons from the educational psychology fields.

A number of authors argue that education is, or should be, a critical component of 'ecotourism' experiences (Roggenbuck, 1987; O'Laughlin, 1989; Alcock, 1991; Oliver, 1992; Bramwell and Lane, 1993). However, despite widespread support for education as a management strategy for nature-based tourism (reported examples include: Pope, 1981; Price, 1985; Beckmann, 1987, 1988; Whately, 1988; Jelinek, 1990; Burgess, 1992) there has been little empirical research that has demonstrated the specific benefits of education programmes (Uzzell, 1989). This, despite the fact that environmental interpretation — an educational effort directed at revealing the relationships and meanings behind aspects of the natural environment (Tilden, 1957) — has a long-standing tradition in the park management field (Knudson *et al.* 1995).

There is, therefore, a case for assessing the effectiveness of education-based management strategies in managing tourist-nature interaction. If the objectives of such strategies are

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sound, the potential exists to increase visitor enjoyment and understanding, and prompt more environmentally responsible behaviour. This paper outlines the testing of such a strategy in a situation where tourists interact with wild dolphins off the coast of Australia. It considers the effectiveness of education as a possible solution which assists in minimising risks and maximising benefits in nature-based tourism.

Study Site

Tangalooma is a tourist resort in South-eastern Queensland, Australia (Figure 1). Since 1992 a group of wild bottlenose dolphins have been regular visitors to the beach adjacent to this

resort (Orams, 1994a). The dolphins visit the area nightly to receive fish handouts from tourists in shallow water beside the resort's pier. This opportunity has been promoted as an attraction and it has become increasingly popular with tourists since its inception.

The opportunity with this wildlife-based tourism case was used to assess the effectiveness of an environmental education programme as a mechanism to promote environmentally desirable changes in tourists' attitudes and behaviour. Thus, the contention of many authors, namely that education is an effective mechanism for prompting tourists to become more 'green' (environmentally responsible), was tested.

The study used the dolphin interaction pro-

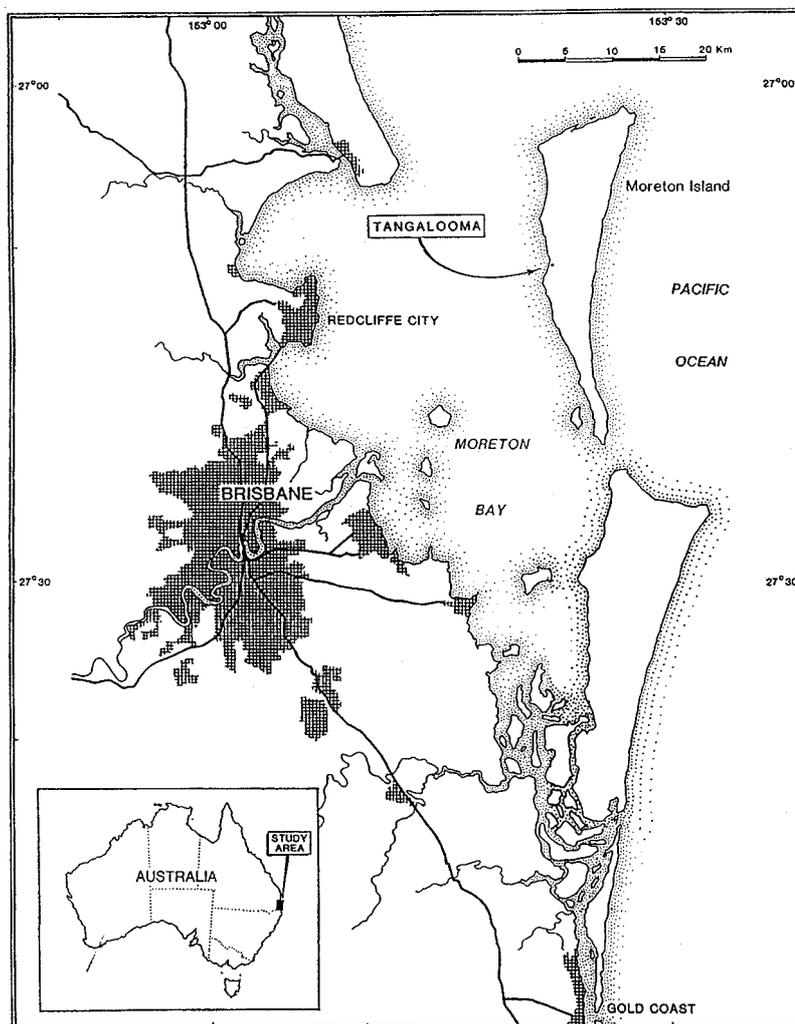


Figure 1. Location of study site: Tangalooma, Moreton Island.

gramme to compare tourists who were exposed to a structured education programme (the experiment group) with those who were not (the control group). A number of indicators of changes in levels of enjoyment, knowledge, attitudes, intentions and behaviour were measured and compared between the control and experiment groups in order to ascertain the impact of the education programme.

Development of an Education Programme

A common assumption made by many in the nature-based tourism industry is that through interaction with nature, environmental awareness and responsibility in participants is created (Russell, 1994). A second common assumption is that through improving an individual's level of knowledge by means of an education programme, somehow — magically — a change in attitudes and behaviour regarding the subject matter is induced. In reality this is seldom, if ever, the case (Orams, 1994b). It is both logical and obvious that if an education programme does not deliberately set out to change attitudes and behaviour it is extremely unlikely to do so.

A review of literature from the educational psychology field shows that the cognitive processes involved in learning are complex, and, consequently, prompting changes in attitudes and behaviour is extremely difficult. The challenge of education (that is, facilitating learning) is rendered more difficult by the circumstances which exist in most tourism situations. Issues such as a diverse range of ages, educational

backgrounds, cultures and even languages make even simple communication a frustrating task. Add to that an extremely limited time-frame, a non-captive audience (that is, you cannot *make* tourists listen, participate nor remain in your programme) and frequent distractions that often occur, and it becomes apparent that educating tourists is difficult. In fact a number of authors are extremely cynical about the potential of education for managing tourism. This comment of Wheeler's (1994, p. 9) typifies the attitudes of a number of commentators: 'Education is seen by many as the way forward for nurturing a "better" tourism. Dream on.'

In contrast to this cynicism, many other authors are optimistic about the potential of education programmes for tourists (for example, Field and Wagar, 1982; Forestell, 1990; Alcock, 1991; Ham, 1992; Bramwell and Lane, 1993). There is much anecdotal evidence that direct interaction with nature often results in profoundly important experiences where tourists do develop new attitudes and adopt new behaviour: in other words significant learning does occur. The issue arises therefore, in what circumstances is 'environmental learning' likely to occur and what type of educational programme is best suited to maximising learning? Once again, the volume of literature reporting research in more traditional educational settings is valuable in determining what type of educational programme is likely to be effective in tourism situations.

A model proposed by Orams (1996) incorporates a number of strategies which have been identified as powerful tools in the learning process. This model is shown in Figure 2. The model identifies five main techniques which can

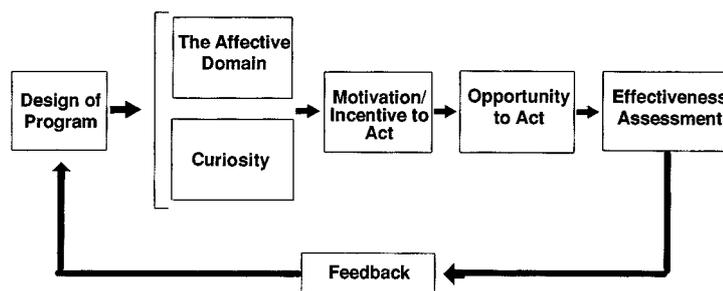


Figure 2. Features of an effective education programme for tourists (after Orams, 1996).

be effective in prompting behaviour change in an ecotourism setting. These techniques (represented in Figure 2) can be summarised as follows:

- Curiosity — creating questions in peoples' minds. The education programme should attempt to arouse participants' curiosity, to get them thinking by offering interesting questions. For example, in the case presented in this paper questions such as how do dolphins sleep, or, what is the biggest enemy that dolphins have, are appropriate.
- The affective domain — using techniques and stories to involve participants' emotions. Emotional involvement in the subject matter is an effective 'short cut' in the learning process. Topics such as birth, death, caring, 'life's challenges' all evoke people's emotions. It is suggested that by invoking the 'affective domain' programme messages are more effectively 'internalised' and are more likely to be acted upon.
- Creating motivation to act — the programme should outline the specific environmental problems/issues or themes that are relevant to the tourism experience. Simple solutions and actions that can be taken to reduce these problems should then be outlined. Specifically, the programme should personalise the message: 'here's what you should do to make a difference'.
- Giving opportunities to act — finally, the programme should actually provide opportunities for people to take action, then and there. Petitions to sign, environmental organisations to join, environmentally friendly products to buy and activities to undertake allow tourists to act on the motivation created by the programme. This stage is extremely important; most participants in nature-oriented tourism programmes have good intentions. However, after they leave those intentions may not result in changed behaviour. By providing opportunities for participants to take action, effective behaviour change can be prompted 'on the spot'.
- Evaluation and feedback — an important component of any programme is an assessment of its effectiveness and a feedback of the results of this assessment into the planning for the programme.

Implementing the Programme

An education programme which contained the above features was designed for the Tangalooma Dolphin Feeding Programme and its effectiveness assessed as part of the study reported in this paper. The education programme was implemented during 1994 and contained two main features. First, a visitor information centre was established. This facility, which was called the Dolphin Education Centre, contained a variety of information on whales and dolphins and included a small library, posters, displays and a small theatre where videos were shown. This centre was staffed by the principal researcher, assisted by volunteers, was open for visitors every afternoon and became the focal point for the dolphin feeding programme.

The second feature of the programme was that a public address system was constructed which allowed the principal researcher to talk to both dolphin feeders and observers during the feeding sessions. Presentations concentrated on educating tourists about aspects of dolphin behaviour and biology and encouraging people to become more environmentally responsible. In particular, the use of curiosity, the affective domain, the creation of motivation for action and the suggestion of action strategies were features of these presentations.

METHODS

At the most basic level, an education programme should have a positive influence on tourist satisfaction and enjoyment. Additional objectives which can be used to measure a transition from mere enjoyment to desired behaviour change are: initially, increasing knowledge; secondly, the changing of attitudes to those that are more environmentally and ecologically sound; thirdly, creating intentions to change behaviour; and finally actual behaviour change (Orams, 1995). These five steps (or indicators): enjoyment, knowledge, attitude, intentions to change behaviour and actual behaviour change were the categories that were used to measure the effectiveness of the education programme.

The effectiveness of the education programme was assessed by comparing the data gathered during the programme's operation (the experiment group) with those data gathered in 1993,

when the programme was not in operation (the control group). This control–experiment design formed the basis of this study.

The findings of this study are, therefore, dependent upon an assumption that the control and experiment groups differ only in their exposure to the education programme. Thus, any differences found between the groups are able to be attributed to the education programme and not another independently influential variable (say, the educational backgrounds of group members, for example). This important assumption was tested by comparing a range of socio-demographic and self-assessed indices. These included gender, group size, educational background, reasons for visiting, membership of environmental and outdoor recreation organisations, and a self-assessment of knowledge about dolphins. Tests conducted on these indicators showed that there were no significant differences between the control and experiment groups. Consequently, the assumption that both groups were similar, except with regard to their exposure to the education programme, was deemed valid.

A self-reply questionnaire was administered to a random sample of tourists in both the experiment ($n=317$) and control groups ($n=308$), and respondents from each (who agreed) were contacted by telephone within 2–3 months and a short telephone interview was conducted ($n=110$ for control and 104 for experiment groups). Responses between the two groups over the five indicators (enjoyment, knowledge, attitudes, intentions and behaviour) were then compared, primarily using Chi-square analysis. A similar important assumption regarding the characteristics of the interview control and experiment groups needed to be tested. This test revealed that these groups did not significantly differ in terms of the same socio-demographic indicators as measured for the self-reply questionnaire respondents.

RESULTS AND DISCUSSION

Increase Enjoyment

The questionnaire produced a series of responses which indicated the level of enjoyment of tourists at the dolphin feeding. Chi-square tests revealed that there were few significant differ-

ences between the control and experiment groups with regard to questions which assessed enjoyment levels. The general pattern of results showed a strong positive skew, with very few respondents selecting categories that can be classified as negative. A high percentage of respondents indicated that the experience was very enjoyable or one of their most enjoyable experiences ever (see Table 1).

In summary, enjoyment of the 'dolphin experience' was ranked extremely highly by almost all respondents. There was no significant difference detected between control and experiment groups with regard to enjoyment levels as measured by most questions. However, the desire for more information did drop significantly between the control and experiment samples. Additionally, from an open-ended question, compliments significantly increased, and concern over negative impacts of feeding dolphins and suggestions for changes decreased significantly, between control and experiment groups (see Table 1).

Collectively, these results suggest that the education programme did enhance the enjoyment of tourists at the Tangalooma dolphin feeding, although high levels of enjoyment exist irrespective of the education programme. With this fact in mind, it can be concluded that an education programme can increase tourists' level of enjoyment.

It is not surprising that the research at Tangalooma identified that interacting with wildlife is viewed in extremely positive terms. The rapid growth of wildlife-based ecotourism (MacDonald, 1992; Ratnapala, 1992; Miller and Kaae, 1993) suggests that interacting with wildlife is very enjoyable for tourists. This trend has also been noted in research on whale watchers (Neil *et al.*, 1996).

Increase Knowledge

The questionnaire asked respondents to rank their own degree of knowledge on dolphins before visiting Tangalooma. The results to this question are shown in Table 2. There was no significant difference in this self-assessment between control and experiment groups ($\chi^2=0.947$, d.f.=2, $p=0.954$). However, a further question which actually tested the knowledge of respondents towards the end of a dolphin

feeding session showed an increase in correct responses across all seven indicators from the control group to the experiment group. Chi-square tests reveal that these increases are significant across five of the seven indicators (Table 3).

The pattern of increased knowledge, as a result of the education programme, is clear. This finding is encouraging. As a result of this research it can be concluded that an education

programme, despite the limitations of a brief tourism encounter, can increase tourists' knowledge regarding the attraction they visit. Evidence that this is the case has been lacking in the past.

Improve Attitudes

The questionnaire tested respondents' level of agreement/disagreement with three environmental statements. Results are summarised in

Table 1. Statements indicating level of enjoyment of experience (note: respondents could select multiple statements)

| Statement | Percentage of control who selected | Percentage of experiment who selected | χ^2 | d.f. | <i>p</i> |
|---|------------------------------------|---------------------------------------|----------|------|----------|
| It was good but I enjoyed other parts of my stay on Moreton Island more | 9.5 | 9.2 | 0.145 | 1 | 0.904 |
| It was okay | 7.0 | 5.8 | 0.370 | 1 | 0.543 |
| I enjoyed it a lot | 58.8 | 58.0 | 0.370 | 1 | 0.849 |
| I was a little disappointed | 1.4 | 2.0 | 0.346 | 1 | 0.556 |
| It was one of my most enjoyable experiences ever | 29.2 | 28.7 | 0.217 | 1 | 0.883 |
| It was not as good as I thought it would be | 1.8 | 1.7 | 0.002 | 1 | 0.960 |
| It was good, but I would have liked to have learned more | 32.4 | 11.6 | 36.52 | 1 | <0.001 |
| I have not really decided what I think about it | 0.7 | 2.6 | 6.46 | 1 | 0.167 |
| Open ended question results | Percentage of control who selected | Percentage of experiment who selected | χ^2 | d.f. | <i>p</i> |
| Compliments | 29.9 | 50.0 | 10.503 | 3 | 0.0147 |
| Suggest change to programme | 26.8 | 17.4 | 10.503 | 3 | 0.0147 |
| Concern over negative impacts on dolphins | 17.5 | 7.0 | 10.503 | 3 | 0.0147 |
| Other | 25.8 | 25.6 | 10.503 | 3 | 0.0147 |

Table 2. Self-assessment of knowledge about dolphins before Tangalooma visit

| Category | Percentage of control | Percentage of experiment |
|---------------|-----------------------|--------------------------|
| Above average | 12.5 | 11.7 |
| Average | 55.3 | 56.0 |
| Below average | 32.2 | 32.3 |

$\chi = 10.503$, d.f. = 2, $p = 0.0147$.

Table 3. Results of knowledge test

| Topic | Percentage of control who answered correctly | Percentage of experiment who answered correctly | χ^2 | d.f. | <i>p</i> |
|-----------------|--|---|----------|------|----------|
| Echolocation | 89.5 | 91.2 | 0.838 | 2 | 0.658 |
| Aggression | 28.2 | 49.8 | 32.66 | 2 | <0.001 |
| Species type | 75.5 | 87.2 | 13.83 | 2 | 0.001 |
| Groups/solitary | 12.4 | 42.0 | 72.29 | 2 | <0.001 |
| Predators | 59.8 | 66.2 | 3.421 | 2 | 0.181 |
| Vision | 21.9 | 47.0 | 43.530 | 2 | <0.001 |
| Protection | 55.9 | 66.9 | 8.941 | 2 | 0.011 |

Table 4. For each statement a correct response was that which strongly indicated an attitude which was 'environmentally sound'. Categories were collapsed, for analysis purposes, into correct (strongly disagree, disagree, and mildly disagree), neutral (neutral) and incorrect (strongly agree, agree and mildly agree) responses.

Responses to a statement pertaining to controlling shark levels in Moreton Bay resulted in 39.4% of the control group responding correctly. This response rate increased in the experimental group to 49.8%. This increase is significant ($\chi^2=7.271$, d.f.=2, $p=0.026$). However, statements regarding actions affecting the sea ($\chi^2=0.178$, d.f.=2, $p=0.915$) and regarding pollution responsibility ($\chi^2=0.069$, d.f.=2, $p=0.355$) did not show any significant change from control to experiment.

Measuring respondents' attitudes towards the natural environment proved extremely difficult. Most respondents, in both control and experiment groups, showed a strongly positive environmental attitude. This is not surprising because, over the past decade, environmental

issues have been widely discussed and are familiar to many. As a result, most respondents know the 'desirable' answer to a question about environmental attitudes. Therefore, it is difficult to determine whether a response to a question on environmental attitudes actually reflects true attitudes or is simply given as the socially/politically correct answer (Ryan, 1995). This 'social desirability' influence may have been significant in this study.

Despite the failure to detect changed attitudes from the questionnaire, there were indications that the education programme did have an influence in this area. The responses to the follow-up telephone interview showed that 8.3% of respondents in the control group gave an unsolicited comment that they had become more environmentally aware as a result of their experience with the dolphins. This response rate increased significantly to 20.4% in the experiment group. It appears, therefore, that the participants themselves felt that the interaction with the dolphins improved their environmental attitude (at least as expressed by the 'greater environmental awareness' comments). The

Table 4. Results of attitude test

| Topic | Percentage of control who answered correctly | Percentage of experiment who answered correctly | χ^2 | d.f. | <i>p</i> |
|------------------------------|--|---|----------|------|----------|
| Shark control | 39.4 | 49.8 | 7.271 | 2 | 0.026 |
| Effect on the sea | 70.1 | 71.6 | 0.178 | 2 | 0.915 |
| Responsibility for pollution | 91.2 | 93.1 | 2.069 | 2 | 0.355 |

failure of the questionnaire to detect changes in environmental attitudes may be related to the question used in the questionnaire. It is likely that improved environmental attitudes did result from the education programme, but the first research instrument failed to detect this.

Create Desirable Intentions

The questionnaire solicited responses to five statements which indicated the degree of commitment respondents had to changing their behaviour as a result of their experience with the dolphins. This question showed a clear and consistent pattern from control to experiment groups (see Table 5). Intentions to change behaviour were high for both groups, and no significant differences between groups were present. Categories were again collapsed for analysis purposes. Response options 'definitely not', 'probably not', 'I doubt it' and 'I'm not sure' were amalgamated into one category labelled 'negative'. 'Possibly' and 'probably' were amalgamated into a 'positive' category and 'definitely' remained as a separate category.

The majority of respondents indicated that they intended to tell their friends about the dolphins. However, these data were not significantly different from control to experiment ($\chi^2=2.428$, d.f.=2, $p=0.297$). Many thought they would try and get more information about dolphins, but again, the groups were not significantly different ($\chi^2=1.805$, d.f.=2, $p=0.406$). Similarly, most respondents indicated that they would pick up beach litter which could harm

dolphins, but control and experiment groups were not significantly different ($\chi^2=2.742$, d.f.=2, $p=0.254$). Becoming more involved with environmental issues as a result of their experience with the dolphins received strong support from both groups, but the groups did not significantly differ ($\chi^2=1.624$, d.f.=2, $p=0.444$). Finally, many tourists indicated that they intended to make a donation to an environmental organisation, but again the control and experiment data were not significantly different ($\chi^2=3.740$, d.f.=2, $p=0.154$).

The intentions to change behaviour, of both the control and experiment groups, were extremely positive (Table 5). Once again, this positive skew of the data contributed to the lack of statistical significance between the groups. The influence of 'social desirability' when responding to this question is also likely to be high, so that respondents are likely to state that they intend to do good things as a result of their experience with the dolphins. Consequently, no significant differences were detected between the groups. The education programme cannot be shown to have increased tourists' intentions to conduct themselves in a more environmentally responsible manner. However, this does not mean that such a change did not occur. The results of the follow-up interview suggest that the education programme did influence tourists' intentions because significant increases in actual behaviour change were detected (see next section).

The marked positive skew in data resulting from a number of attitude, intentions to change

Table 5. Intentions to change behaviour as a result of experience with the dolphins

| Statement | Percentage of control | | | Percentage of experiment | | | χ^2 | d.f. | <i>p</i> |
|--|-----------------------|----------|----------|--------------------------|----------|----------|----------|------|----------|
| | Negative | Positive | Definite | Negative | Positive | Definite | | | |
| Tell friends about the dolphins | 3.4 | 22.4 | 74.2 | 2.0 | 27.1 | 70.9 | 2.428 | 2 | 0.297 |
| Try and get more information about dolphins | 19.8 | 58.7 | 21.5 | 22.9 | 53.1 | 24.0 | 1.805 | 2 | 0.406 |
| Remove beach litter that could harm dolphins | 6.6 | 36.7 | 56.7 | 4.3 | 33.1 | 62.6 | 2.742 | 2 | 0.254 |
| Become more involved in environmental issues | 22.8 | 51.9 | 25.3 | 25.5 | 46.5 | 28.0 | 1.624 | 2 | 0.444 |
| Make a donation to an environmental organisation | 29.8 | 54.4 | 15.8 | 26.6 | 51.3 | 22.1 | 3.740 | 2 | 0.154 |

behaviour and enjoyment questions in the questionnaire has been noted with other tourism research.

One problem that can occur frequently in attitudinal research relating to holidays is that because people enjoy themselves, scores on a Likert-type scale or semantic differential are not normally distributed. They tend to be skewed towards the top end. (Ryan, 1995, p. 168)

This problem was recognised before the study was undertaken and, as a result, categories and statements were selected which attempted to distribute these positive attitudes over a series of options which reflected the positive nature of the responses. Nevertheless, positive skewing did result. When such an influence occurs it is difficult to determine the significance of changes between the control and experiment groups.

Prompt Environmentally Responsible Behaviour

The follow-up interview assessed whether actual behaviour change had occurred subsequent to

the experience with the dolphins. Questions asked in the interview followed the same format as for the questionnaire, except respondents were asked whether they had actually carried out their stated intentions. With the exception of the question pertaining to telling friends about the dolphins, a clear and consistent difference existed between the control and experiment groups for these data (Table 6).

98.2% in the control and 99.0% in the experiment had told friends about the dolphins. These results are not significantly different from one another ($\chi^2=0.284$, d.f.=1, $p=0.594$). However, only 13.6% of respondents in the control group had attempted to obtain more information on dolphins, compared with 41.7% of the experiment group. This difference is significant ($\chi^2=21.213$, d.f.=1, $p<0.001$). Of those respondents who had visited a beach since visiting Tangalooma, 44.9% of the control group had picked up rubbish that they had seen. Within the experiment group 65.2% had done so. This increase is also significant ($\chi^2=25.915$, d.f.=2, $p<0.001$). Only 6.4% of respondents in the control group stated that they had become more involved in environmental issues as a result of their experience with the Tangalooma dolphins;

Table 6. Actual behaviour change as a result of experience with the dolphins (follow-up interview)

| Action | Percentage of control | | Percentage of experiment | | | | χ^2 | d.f. | p | | |
|--|-----------------------|------|--------------------------|------------------|-----------|-----------|--------------------|------------------|--------|---|--------|
| | No | Yes | No | Yes | None seen | None seen | | | | | |
| Told friends about the dolphins | 1.8 | 98.2 | 1.0 | 99.0 | | | 0.284 | 1 | 0.594 | | |
| Got more information about dolphins | 86.4 | 13.6 | 58.3 | 41.7 | | | 21.213 | 1 | <0.001 | | |
| Removed beach litter | No | Yes | None seen | No | Yes | None seen | 25.915 | 2 | <0.001 | | |
| | 50.0 | 44.9 | 5.1 | 13.0 | 65.3 | 21.7 | | | | | |
| Became more involved in environmental issues | No | Yes | No, but more aware | Already involved | No | Yes | No, but more aware | Already involved | 35.206 | 3 | <0.001 |
| | 72.5 | 6.4 | 8.3 | 12.8 | 40.8 | 32.0 | 20.4 | 6.8 | | | |
| Made a donation to an environmental organisation | No | Yes | No, but intended to | Already donate | No | Yes | No, but intend to | Already donate | 22.26 | 3 | <0.001 |
| | 76.9 | 11.1 | 3.7 | 8.3 | 49.5 | 23.3 | 19.4 | 7.8 | | | |

however, in the experiment group 32.0% stated that they had done so. Additionally, within the control 8.3% stated that they were more environmentally aware, whereas 20.4% said so within the experiment. These differences are significant ($\chi^2=35.206$, d.f.=3, $p<0.001$).

Finally, the same pattern exists for the numbers of respondents who stated that they had donated to an environmental organisation as a result of their experience with the Tangalooma dolphins: 11.1% for the control and 23.3% for the experiment. Furthermore, of those who stated they had not donated, an unsolicited response that they still intended to donate, rose from 3.7% in the control to 19.4% in the experiment. These differences are, once again, significant ($\chi^2=22.26$, d.f.=3, $p<0.001$).

The results of the follow-up interview are particularly important in the context of the objectives of this study. Literature reviewed earlier showed that prompting behaviour change is particularly difficult to achieve (Gudgion and Thomas, 1991). The results of the follow-up interviews show that the education programme was effective in prompting tourists who visited the Tangalooma dolphin feeding to carry out their stated intentions to take action (Table 6).

Predictably, both control and experiment respondents carried out their intentions to tell friends about the dolphins after their trip, and there was no significant influence of the education programme on this indicator. However, the education programme prompted a significantly higher level of action across all the other indicators measured. Thus, it is concluded that an education programme caused tourists to change aspects of their behaviour and become more environmentally responsible. These results are extremely important because the ultimate objective of the education programme is to produce behaviour change which benefits the environment upon which the ecotourism is based. Although the type of behaviour change prompted in this study does not directly benefit the Tangalooma dolphins; these changes benefit the marine environment indirectly and, through this, the animals that live in it.

This research has shown that, despite many authors' cynicism (Hammit, 1984; Burgess, 1992; Wheeler, 1994), behaviour change can be prompted by a carefully structured education programme. Empirical evidence of this fact has

long been lacking (Olsen *et al.*, 1984; Beckmann, 1988; 1989; Uzzell, 1989; McArthur and Hall, 1993). The findings of this study provide evidence that the optimism expressed by many (Field and Wagar, 1982; Forestell, 1990; Alcock, 1991; Ham, 1992; Bramwell and Lane, 1993; Orams, 1996) regarding the potential of education as a management strategy in ecotourism situations is justified.

CONCLUSIONS

The study conducted at Tangalooma showed that interacting with dolphins produced a desire in tourists to change their behaviour and become more environmentally responsible or more 'green'. However, those tourists who were not given the structured education programme seldom carried out these good intentions. Those tourists who were given the education programme became significantly more 'green' in their behaviour. Thus, an education programme, combined with the experience of interacting with dolphins, was an important influence on tourists' behaviour.

The potential for education programmes to influence the behaviour of tourists is clear. Without a structured education programme, nature-based tourism is unlikely to produce changes in tourists' behaviour. Consequently, the claim that nature-based tourism changes people, and thus that it benefits the natural environment and becomes 'ecotourism', is false. However, a structured educational programme, based upon educational psychology, can prompt changes in tourist behaviour. Tourists subject to such a programme can be prompted to become more 'green' and adopt more environmentally responsible practices.

The research presented in this paper adds weight to the argument that education should receive greater emphasis in tourism management. It currently receives, with a few notable exceptions, little more than 'lip service' as an approach to maximising the benefits from nature-based tourism enterprises. Many claim it is the answer, very few apply it, and even fewer test its effectiveness. It is hoped that the work presented here will help to provide an impetus for greater attention on education as a formalised component of tourism management. Perhaps this increased attention may lead the so-called

'ecotourism' industry toward achieving its lofty aspirations and become beneficial to both the environment and people.

ACKNOWLEDGEMENTS

This paper is developed from a poster paper presented to the 'Encounters With Whales 95' conference, Hervey Bay, Queensland, 26–30 July, 1995. Support was provided by a University of Queensland Postgraduate Research Scholarship, a grant from the Royal Geographical Society of Queensland and Tangalooma Moreton Island Resort. The author thanks the anonymous referees for their comments on an earlier version of this paper.

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