

# Changes in Attitudes, Beliefs and Behaviour: A Critical Review of Research into the Impacts of Environmental Education Initiatives

Anna Gralton, Mark Sinclair & Ken Purnell<sup>†</sup>  
*Central Queensland University*

## Abstract

This paper reviews research literature on the impact of environmental education initiatives on learners' attitudes, beliefs and behaviours. The review focuses on initiatives involving learners of all ages and school-aged learners in particular. The review shows two things. There is some evidence that environmental education initiatives are associated with changed beliefs and attitudes, and this is mainly in the short-term. There is little evidence that environmental education initiatives lead to behavioural change, especially in the longer-term. The review concludes that there is a need for more and better research evidence that behavioural change in learners follows from involvement in environmental education.

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## Introduction

There has been steady growth in environmental education (EE) initiatives over the last two decades, accompanied by a corresponding growth in the conceptual parameters of what EE refers to. Concepts of EE and their referents are matters of ongoing debate; however, the effects of EE initiatives are equally important. In view of the fact that it is the outcomes of these initiatives (e.g., the development of environmental behaviour) that are more conducive to a sustainable environment, then an increased focus on the empirical outcomes and a little less involvement in debates over the concepts of EE is justified. This review provides an overview of EE concepts. It discusses research literature about some EE initiatives, practised on this conceptual foundation; that is, EE should incorporate education about, in and for the environment (Lucas, 1972).

The debate over whether EE should involve education about the environment (i.e. the provision of information on environmental issues and the teaching of skills), education in the environment (i.e., EE occurring outside the classroom), and/or education for the environment (i.e., the development of interest and concern for the environment and the motivation of related attitudes and values) (Linke, 1980) is an ongoing deliberation. The three approaches, it is suggested, are closely aligned with the theoretical paradigms: positivism (about); constructivism (in) and critical theory (for) (Santos et al., 2000). The three paradigms, each espouse a distinct and "incompatible" ideological worldview (Wals & Leij, 1997) and corresponding conceptions of EE (Santos et al., 2000). Robottom (1987, p. 103) suggests education about the environment, a

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<sup>†</sup>*Address for correspondence:* A/Prof Ken Purnell, Associate Dean (Teaching & Learning) and Head of School, Education & Innovation, Faculty of Education & Creative Arts, Central Queensland University, Rockhampton, Qld 4702. Email k.purnell@cqu.edu.au

“technocratic worldview”, claims that if the learner is given knowledge, over time, the most appropriate actions and outcomes will be achieved; however, this discounts “the qualitative dimensions of the majority of environmental issues” (e.g., emotions, beliefs, vested interests) in achieving these outcomes. Additionally, concern over education for the environment suggests that it is value-laden and that educators’ opinions and values should be absent from all education (Jickling, 1997).

In this paper, the above debate is considered to be essential; however, and as the review demonstrates, more attention to empirical outcomes is warranted. After years of calls for better quality and more research (see for example, Linke 1980 and the inadequacies of evaluation research in the field back then) there is still a paucity of such in the field of EE research. If environmental sustainability is the primary goal in all of this, should we not concentrate on EE initiatives that are shown to work (through empirical outcomes), rather than focusing on concepts and schemes that purport to do so.

Following an overview of some EE concepts and initiatives, this review examines the impact of EE initiatives on learners’ beliefs, attitudes and behaviours, commencing with studies of long term impacts, studies on attitudinal impacts and, finally, referring to studies on behavioural impacts (which may also include attitudinal impacts). The dearth of “hard” evidence supporting the view that EE initiatives are associated with changes in behaviour is highlighted. The paper concludes that, if EE is to realise its potential as a force for global sustainability, then there is a need for more and better research evidence that behavioural change in learners follows from involvement in EE.

### **Concepts of Environmental Education: An Overview**

EE researchers acknowledge the importance of and need for EE but the term itself is evolving. For example, Environment Australia (1999a) proposes that it may encompass the increasing of environmental awareness, the development of “perspectives, values, knowledge and skills”, and the use of “formal and informal processes” to achieve behavioural changes that favour environmental sustainability. This is a somewhat apolitical definition. In contrast, the Tbilisi Declaration of 1977 is more political. It defines a major goal of EE as the development of “new patterns of behaviours of individuals, groups and society as a whole towards the environment” (Environment Australia, 1999b). Environmental educators who subscribe to this and similar action-oriented goals suggest that teaching merely about the environment is not enough to develop responsible environmental behaviours that are conducive to a sustainable environment. Rather, EE means education in, about and for the environment (INforEEP, 2000). In this view, learners are provided with the opportunity to understand and transform problem environments (INforEEP, 2000). EE initiatives aim to have impacts on learners’ environmental beliefs, environmental attitudes and environmental behaviour. These terms are briefly defined before proceeding.

### **Beliefs, Attitudes and Behaviours**

An environmental belief may refer to a learner’s ideas or perspectives about an environmental issue and what is considered to be correct in relation to this issue (Ramsey & Hungerford, 1989; Ramsey, 1993). This schemata (cognitive constructs) of belief is similar to the more apolitical conception of EE illustrated above. In contrast, a pro-environmental attitude may be defined as a predisposition to be interested in, concerned about and to positively act towards the environment (Corraliza & Berenguer, 2000). This attitudinal schemata is closer to the more action-oriented version of EE discussed above. These two examples illustrate differences between concepts of belief

and attitude that are recurrent throughout the conceptual framework of EE. The former is a descriptive definition. The latter is prescriptive, incorporating a disposition to act (although not action itself).

The recent and present trend is toward EE concepts that refer explicitly to actions that support environmental sustainability. This trend has implications for EE initiatives, implications we now make explicit by examining an indicative sample of literature. The selection criteria for this review included: old and new studies; formal education programs; worldwide studies; studies that measured the long-term impacts resulting from EE initiatives; and, studies of programs that developed or did not develop, either attitudes, behaviours, or both.

### **Environmental Education Initiatives**

Formal EE initiatives can include in-class programs or out-of-class, outdoor education programs. This review examines formal environmental education and recognises that informal environmental education is certainly a critical factor in EE. Eaton (1998) proposes that outdoor education includes school-related educational activities conducted outside of a residential centre or school. Other terms variously used in research literature to describe outdoor education include: Conservation education, which is targeted at natural resource use and management; Outdoor recreation, which includes activities such as swimming, boating and camping; Outdoor pursuits which often is undertaken in remote areas with non-mechanised activities; Adventure education, such as rope climbing and rope courses; Experiential education, which refers to learning through doing; and Environmental interpretation, which assists understanding within visitor centres and parks (Eaton, 1998). EE can also include combinations of these.

This sample of frameworks for outdoor EE initiatives illustrates the proliferation of concepts and attendant initiatives that characterize EE in general. In short, almost anything could be construed as an EE initiative and further, elaborating on this phenomenon would be both tedious and unrewarding. Investigating the impacts of EE initiatives, however defined, is a more fruitful exercise.

### **The Impact of EE Initiatives on Learners' Beliefs, Attitudes and Behaviours**

Arguably, behavioural change is a penultimate goal if the final goal of EE is environmental change for the better. There is little point in thinking, feeling and speaking congenially about the environment if change does not follow. Yet previous reviews of EE research literature have highlighted an historical absence of connection between these two goals and EE initiatives.

For example, Iozzi et al. (1984) studied EE initiatives over the period 1971-1982. They found that more than 70 percent of the research was "descriptive". In other words, the research focus in the 1970's was on initiatives more than on outcomes from those initiatives. A decade later, Leeming, Dwyer, Porter & Cobern (1993) reviewed EE research conducted between 1974-1993. Those authors found an abundance of literature but a lack of empirical evidence of behavioural change; of the 34 studies reviewed, Leeming et al. (1993) found that only five measured impacts on environmental behaviour. Zelezny's (1998) more recent review was a little kinder. It found that EE studies have examined the outcomes of interventions on pro-environmental knowledge and attitudes, with fewer projects researching the impacts on pro-environmental behaviour. In an attempt to discover recent trends and findings in the field of EE research, Rickinson (2001) conducted a review of 100 empirical studies, published between 1993 and 1999. The review included research on learners and/or learning in

primary and secondary school EE. Data indicated that education interventions, such as residential field trips and school-based programs, could impact upon students' environmental knowledge or attitudes and in some cases behaviour (Rickinson, 2001). However, Rickinson (2001) further found that the field of EE research lacks evidence that EE promotes long-term behavioural changes.

### **Measurement of Long Term Impacts**

Rickinson (2001) refers to these long-term impacts or "the sustainability of changes" as "durability". More specifically, individual "durability" studies tend to measure changes in participants' environmental knowledge, attitudes and behaviour within six months of the intervention. For example, Zint et al. (2002) measured knowledge retention six months following an intervention. Bogner (1998) conducted a post-test six months after a residential EE program to measure students' ecological knowledge, attitudes and behaviour. Hanna (1995) administered a post-test to measure intended behaviour versus self-reported post-program behaviour six months after adult participants had completed an adventure program and an ecology-education program. Four months following an interpretive experience, interviews were used by Knapp and Poff (2001) to measure the development of cognitive information and environmentally responsible behaviour. Dettman-Easler and Pease (1999) studied changes in the development of attitudes to wildlife, two to three months after participants had completed a residential EE program. The impact of an EE program on environmental behaviour was measured by Hungerford and Volk (1990) within three months of the completion of the program. Jordan, Hungerford and Tomera (1986) post-tested participants' knowledge of environmental action and reported environmental actions two months after a residential environmental workshop. Ramsey, Hungerford & Tomera (1981) monitored changes in knowledge of environmental action skills and overt environmental behaviours two months following environmental instruction. Horsley (1977) conducted a post-test seven weeks after a conservation program, to measure impacts upon environmental attitudes and behaviour. Dresner and Gill (1994) measured campers' development of environmental concern, awareness, skills and responsible behaviour six weeks after the implementation of an EE program. Perdue and Warder (1981) post-tested impacts on environmental attitudes six weeks after a seventeen-day wilderness survival course.

A few studies have measured the durability of impacts over a longer time frame than the six week to six month ones noted in the above review. One year after a one-day field trip, Gross and Pizzini (1979) investigated impacts on environmental attitudes. Harding (1997) measured participants' ecological knowledge one year after an outdoor residential program. Jaus (1984) measured the long-term impact that a two-hour EE intervention had on Grade three students' environmental attitudes two years later. Driver and Johnson (1983-84) collected self-reports on the development of environmental awareness and interest three to six years following participation in the Youth Conservation Corps.

Comparison of these short versus longer term research designs indicates an ongoing methodological weakness in EE research. Longitudinal designs are scant (Leeming et al., 1993; Backman & Crompton, 1984; Lewis, 1982). Simultaneously, as the proliferation of EE concepts implies, fields of EE such as outdoor education have seen changes to "programs, philosophical foundations, training and personnel" such that older studies may no longer be relevant (Eaton, 1998, p. 54). Stewart's (1982, p. 42) critique of empirical EE research proposed that the EE field must develop a means of reporting findings "consistently and logically". In other words, the development of more up-to-date EE studies with strong and consistent methodological designs would

do no harm. There is, after all, some research evidence that the prior conditions of behavioural change, namely attitudes toward and beliefs about the environment, can be influenced by EE initiatives.

### **Studies on Attitudinal Impacts from EE Programs**

Recent studies have found that the implementation of EE programs develops positive environmental attitudes (Mittelstaedt, Sanker & VanderVeer, 1999; Dettmann-Easler & Pease, 1999). These are consistent with older studies finding some degree of impact (Carlson & Baumgartner, 1974; Gross & Pizzini, 1979; Birch and Schwaab, 1983; Jaus, 1982; Jaus, 1984). Mittelstaedt et al. (1999) studied the impact of a one-week summer science camp in a Nature Preserve on the development of environmental attitudes toward environmental and outdoor concepts, and explored the relationship between attitudes and behaviour. They found that participant attitudes improved significantly. Dettman-Easler and Pease (1999) measured the impacts of six residential environmental education centres' programs of one to four nights' duration on the development of students' wildlife attitudes. The experimental group's pre-test attitudes were not significantly different from the control groups' (the control had been given an in-classroom wildlife program), but post-test scores differed. The experimental group's increase in environmental attitudes was found to have been maintained over two to three months following the program.

The impact of two one-week natural resource camps on youth attitudes toward natural resource management was measured by Carlson and Baumgartner (1974), who found that some attitudes were positively impacted and overall attitudes became more favourable towards the use and management of natural resources. Gross and Pizzini (1979) studied the impact of an advance organiser and a one-day field trip on the environmental orientations of elementary students. They found that attitudes increased significantly as a result of the intervention and were maintained when measured a year later. The effects of a water conservational instruction unit on primary school students' environmental attitudes were measured by Birch and Schwaab (1983). They found that the program developed positive environmental attitudes. Jaus (1982) examined the impact of ten-hours environmental education instruction on primary school students' attitudes. Data indicated that the program changed the students' slightly positive environmental attitudes to strongly positive ones. Jaus (1984) measured the durability of primary school students' environmental attitudes two years after two hours of environmental instruction. An initial post-test, three days after the program, revealed that there was a significant gain in attitudes by the experimental group and that compared to the control groups, pre-test scores were not significantly different but the post-test scores were. A minor decrease in environmental attitudes was found between the experimental groups' initial post-test and another post-test conducted two years later.

In contrast with the "positive" findings such as the foregoing, other recent studies have found that environmental education programs do not have an impact on environmental attitudes (Harding, 1997; Oberst, 1997; Eaton, 1998; Zelezny, 1998). These are consistent with earlier literature presenting similar findings (Perdue & Warder, 1981, Shepard & Speelman, 1985, Ryan, 1991, Keen, 1991, Armstrong & Impara, 1991). Harding (1997) measured the impact of a three-day outdoor residential EE program on primary school students' environmental attitudes and ecological knowledge. The data indicated that students' ecological knowledge was impacted initially, but a year later decreased. Environmental attitudes were not significantly increased. Oberst (1997) examined the impact of a residential environmental education program on ecological knowledge and environmental attitudes. The program impacted

ecological knowledge but not environmental attitudes. The effect of a half-day outdoor education experience on primary school students' cognitive achievement and environmental attitudes was measured by Eaton (1998). A control group also received similar classroom instruction. Neither the experimental nor the control groups' environmental attitudes changed, although both programs reportedly produced gains in cognitive learning, with the outdoor experience contributing more gain. Zelezny (1998) examined students' environmental attitudes and behaviours and their maintenance after the implementation of a school-recycling program. Environmental attitudes were reported as not developed as a result of the program and student participation in the program was significantly lower than the intended levels of environmental behaviour expressed by students prior to the implementation of the program.

The effect of a seventeen-day Wilderness Survival Course on the development of participants' environmental attitudes was measured by Perdue and Warder (1981). A post-test (7 days into a 17 day course) revealed that the course did not have a significant impact on either the wilderness attitude score or patterns of attitude change. However, a post-test was administered six weeks after the program and a significant change towards favourable attitudes was found to have occurred. Shepard and Speelman (1985) measured impacts on the environmental attitudes of nine to fourteen year olds of three and five-day outdoor education residential programs. Differences were found between the three-day and five-day programs, but generally the programs had little impact on environmental attitudes. Ryan (1991) examined the impact of a conservation education program on primary school students' environmental attitudes one-year after the completion of the program. Participation in the program did not lead to the development of significantly different attitudes towards the environment. Keen (1991) studied the impacts of an EE program on primary school students' environmental attitudes and ecological knowledge, finding that the program significantly affected the students' ecological knowledge but not their environmental attitudes. The impact of an environmental education supplement on fifth and seventh grade students' environmental knowledge and attitudes was measured by Armstrong & Impara (1991). No significant differences were found between the four treatment groups' and the control group's environmental attitudes following the program, and only one of the issues taught showed a significant difference between treatment and control groups.

In summary, there is contrasting evidence about associations between EE initiatives and attitudinal change and while the evidence "for" is not strong, there are sufficient grounds to believe that EE initiatives can sometimes influence learners' attitudes. This implies that behavioural change can follow, if one assumes that attitudes inform behaviour. Unfortunately, research literature to this effect is in short supply.

### **Studies on Behavioural Impacts from EE Programs**

Studies of the impact of EE programs on behaviour include self-reported, reported, intended and observed behaviour. A number of recent studies based on reported and self-reported accounts have found that EE programs develop positive environmental behaviour (Ballantyne, Fien & Packer 2001; Dresner & Gill, 1994). Older studies of the same sort have produced similar findings (Jordan et al., 1986; Ramsey et al., 1981). Notably, a reported weakness with this type of measurement is that behavioural self-reports often conflict with actual behaviours (Zelezny 1998). Nonetheless, Ballantyne, Fien & Packer (2001) investigated two EE programs for their impact on primary and secondary school students' learning outcomes, attitudinal and behavioural changes, and intergenerational influence. Self-reported accounts indicated that in some cases behaviour had changed. Dresner and Gill (1994) studied the impact of a two-week EE

Summer Nature Camp program on ten to thirteen year olds' levels of environmental concern and environmentally responsible action. They found that the campers increased their levels of interest, awareness and concern for environmental issues. Reports from the participants' parents' corroborated that more environmentally responsible behaviour also occurred.

The impact of six different residential workshops on secondary school students' knowledge of, and willingness to participate in, environmentally responsible behaviour (ERB) was studied by Jordan et al. (1986). Two different types of residential environmental workshops were examined, one on issue awareness and the other on environmental action awareness. Two months later, the participants in the environmental action awareness training reported taking more environmentally responsible actions following the program than before the program and more action compared to the group who received the issue awareness training. Ramsey et al. (1981) likewise studied the effects of two different approaches (environmental awareness and environmental action training) on the educational and behavioural outcomes of secondary school students. The action group identified significantly more categories of knowledge of environmental action than the awareness group and the awareness group more than the control group. It was further found that the action group self-reported significantly more overt environmental action behaviours than the awareness group (which was equivalent to the control group).

Some studies compare reports of participants' intended behaviour with later reported behaviour (Hanna, 1995; Mittelstaedt et al., 1999; Zelezny, 1998; Aird & Tomera, 1977). Hanna (1995) examined the differences and similarities between an adventure program and an ecology-education program, and, the relationship between them and impacts on adult participants' knowledge, attitudes, intentions and behaviour. A relatively strong relationship was found to exist between ecological knowledge and wilderness-issue attitude. A weak relationship between intention to act and self-reported post-program behaviour was found.

Besides Mittelstaedt et al. (1999) discovering that environmental attitudes developed as a result of a one-week science summer camp, they further found that one fourth of intended environmental behaviour was acted out 12 months after completing the program. The effects of a Water Conservation Instructional Unit on primary school students' values and behaviour were measured by Aird and Tomera (1977). The program increased participants' knowledge and values on water conservation. The experimental group reported more intended behaviour than the control group.

One study by Asch and Shore (1975) is quite different to the foregoing in that data were collected by the researcher actually observing behaviour. Following an environmental education program, primary school aged male participants were placed in a natural setting and their environmental behaviour observed. A control group that had not received the instruction was also observed. It was found that compared to the control group, the experimental group demonstrated more conservational behaviour and less destructive behaviour.

Further studies have found that either all or some of the predictors/antecedents/variables related to environmentally responsible behaviour or environmental behaviour can be positively influenced to some degree (Zint et al., 2002; Siemer & Knuth, 2001; Smith-Sebasto, 1995; Ramsey, 1993; Ramsey & Hungerford, 1989). Zint et al. (2002) investigated the impacts on 11-18 year olds of six different conservation education programs ranging from one day to two-weeks. Increases in participants' environmental knowledge, knowledge of actions and skills were reported. Environmental sensitivity increased in the three-day and two-week field trips. There was less evidence supporting increases in individual and group locus of control and participants' intentions to act. In

relation to improvements in participants' environmentally responsible behaviour, the one-day field trip performed well but was viewed as not reaching full potential.

The environmental stewardship outcomes of a partially and fully implemented fishing education program were examined by Siemer and Knuth (2001). The impacts of the program on grade six to eight participants' antecedents of environmentally responsible behaviour were measured. The full program was found more likely than the partial program to increase interest in fishing, participation in fishing, and develop fishing skills and knowledge. Full programs were more likely to influence entry-level variables and have a greater influence on empowerment-level variables in aquatic stewardship education, but were found inadequate for addressing some of the ownership variables that are believed to relate to natural resource management.

Smith-Sebasto (1995) investigated the impact of an environmental studies course on tertiary students' locus of control, perceived knowledge of and skill in using categories of ERB, and, environmentally responsible behaviour. Data indicated the students' internal locus of control improved. The knowledge of and skill in using categories of ERB increased from below average to above average. Self-reports indicated that prior to the program participation in ERBs was below 50 percent, increasing to more than 50 percent of possible instances following the program.

Ramsey (1993) and Ramsey and Hungerford (1989) studied the impact of a program that was designed to develop environmentally responsible behaviour by targeting variables believed to be empirically related (e.g., knowledge, beliefs, values). Ramsey (1993) examined the impacts on grade eight students. Ramsey and Hungerford (1989) examined changes in grade seven students. Both studies found that the program increased reported environmental behaviour, knowledge, skills and beliefs considered important in developing responsible environmental behaviour, locus of control and knowledge of environmental action skills. Environmental sensitivity was not significantly impacted.

### **Limitations to the Review**

This review focused on empirical outcomes throughout the field of EE research. Diversity in theoretical paradigms, the strategies that these direct, and the learners within these programs (e.g., socio-cultural backgrounds and competing social constructions of concepts and meanings) have not been examined. As such, the conclusions drawn from this review are limited in that they do not offer the reader/user a comparison of like and like (i.e., all studies from the same paradigm).

### **Conclusions**

Despite the debate surrounding the definition of EE, or perhaps because of its effect of focussing of research on theoretical matters, as opposed to empirical matters, the field of EE research lacks "hard" evidence about impacts in the form of behavioural changes in participants. This review, like others before it, finds a particular need for the measurement of long-term or durable impacts resulting or not resulting from EE programs. At present, most studies measure impacts from the period immediately after the program through to six months. This raises three important questions: Are impacts resulting from EE maintained over time? What duration of time would indicate valid results? And, is this even a realistic goal? Without evidence bearing on these questions EE cannot situate itself amongst other forces contributing to sustainability.

Our review further finds that evidence of impacts on environmental attitudes subsequent to EE program is mixed. Moreover, while a number of studies measure behaviour via self-reported accounts or reports from teachers and/or parents, there is reason to believe these accounts may conflict with actual behaviours. Similarly, studies

that measure the inconsistencies between intended and actual reported behaviours indicate that intended behaviours are not an effective indication of actual behaviour. Only one study actually observed behaviour, which one might presume is a strong indicator of behavioural change.

This review indicates that EE programs can develop positive environmental behaviours but there is a shortage of “hard” evidence to this effect. This scarcity of verification relates to EE research’s need for stronger methodological designs that measure the durability of both attitudinal and behavioural changes. Perhaps a little less involvement in debates over concepts of EE and greater attention to the matter of empirical outcomes is warranted. After all, this sort of strategy arguably gave birth to EE when human beings first started noticing undesirable and empirically verifiable side-effects as a corollary of human action that was mobilised by theories unrelated to environmental sustainability. By analogy, the environment is more likely to benefit from a focus on the effects of EE initiatives than it is from a market-like spread of concepts and schemes that purport to do so.

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