Successful sustainability education: adapting to the educational habitat

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Abstract

As a matter of survival, we need to educate current and future generations to live sustainably. Education is the way knowledge, ideas and skills are passed on from generation to generation. The learning environment, from the home to institutions, is the habitat that supports education. Effective sustainability education requires a thorough understanding of the habitat in which that education is to take place. Just as organisms are adapted to, and survive best in certain habitats, so too our approach to sustainability education must reflect the learning environment and its learners.

This paper outlines research into managing educational environments and provides simple and practical guidelines to enhance the planning and implementation of environmental education programs. The realities of the variety of learning environments are outlined: from institutional structure, functioning and organisational management, to the home front and vagaries of human nature. A simple model for defining and understanding different educational habitats is provided for educators planning sustainability education programs.

Despite knowing what to do in order to live sustainably, the majority of people fail to follow sustainable living guidelines. New solutions are not easily found within the old system. One needs to step outside the current system in order to solve the problem. It is appropriate that we take lessons from our natural environment to manage the learning environment in which sustainability education is to take place. Adaptive management principles from natural resource management have been used to develop an Adaptive Management Conceptual Framework to guide decision making in the learning environment. This framework can be used by educators at all levels to implement the NSW Environmental Education Plan and it links the Plan's pre-determined indicators to their monitoring, with a defined management strategy.

Introduction

> *"…[I]n the last decade or two something has come through to public consciousness. It is the doubt as to whether the whole apparatus of our civilisation actually works any longer. Is it beginning to fail?*
>
> *The evidence for this suspicion is plentiful. I instance the decay of previously rich and healthy cities from the center outwards, creating ghettos and all the social frightfulness that goes with them… instance pollution on a world-wide scale: the poisoning of the atmosphere, of seas and lakes and rivers. Then there is the widening chasm between luxury and starvation…The question I would like to address is just* ***why?"*** *(Stafford Beer, 1974, p.2).*

These words were spoken in 1974, during the opening lecture of a series given by Stafford Beer, one of the early advocates of cybernetics (the science of effective organisation). It is of grave concern that we do not seem to have made much progress in the last 30 years in managing our civilisation and indeed, have perhaps gone

backwards. However, there is hope here in Australia, with initiatives such as the NSW Environment Education Plan 2002-2005 and Teaching for a Sustainable World (1996). Although society may not appear to have learned much from the likes of Stafford Beer, his insights into organisational management will go some way towards successfully implementing the above Plan.

Education is the way knowledge, ideas and skills are passed on from generation to generation. It is a fundamental part of our survival. The learning environment, from the home to institutions, is the habitat that supports education. This paper describes the educational habitat in terms with which environmental educators are familiar. Research into organisational management is outlined and provides a simple model to use in defining and understanding the educational habitat when planning successful sustainability education programmes.

Finally, taking some lessons from natural resource management, an Adaptive Management Conceptual Framework is introduced. The Framework can be used by educators at all levels to ensure the sustainability of environmental education initiatives, more specifically, to guide the implementation of the NSW Environmental Education Plan 2002-2005.

Defining the educational environment

To understand the educational environment, educators need to place themselves in the position of introducing a species (plant or animal) into a new habitat. Before attempting to do so, they need to fully understand the physical needs and functioning of the species, and to become familiar with the intricacies of the proposed habitat as a dynamic system. One would not usually attempt to grow a rainforest tree in an arid environment or a salt bush in a lily pond. However, through careful habitat manipulation, one can manage to successfully grow plant or animal species in unlikely habitats, although in the long term this practice is unsustainable; as the large-scale salinity problems facing our agriculturalists demonstrate (Australian Conservation Foundation, 2003).

In terms of environmental education introducing the species, or environmental programme, means devising programs appropriate for the audience e.g. what is suitable for a primary school audience is not suitable for adult learners in a community group. However, even with the careful design of a sustainability education program, and its inherent value to current and future generations, the educational habitat (home, institution or community) might be unable to support the programme due to funding, resources, time constraints or competition from other ‘species’ (e.g. other curriculum). If sustainability education is not an integrated and fundamental part of the curriculum or lifestyle, it may be perceived as an ‘invading species’ and excluded.

Figure 1 models a typical institutional learning environment. The **learning environment** components are the students, teaching staff, administration and their interactions with one another (Buchan and Buchan, 2003). Those operating within the learning environment are able to control and influence within this sphere. Impacting on this environment are the **external environmental** components; economics, social, physical and political, which generally cannot be directly controlled, but do need to be managed.

This model can be adapted for a variety of learning environments including the home and community. For the environmental educator introducing an isolated programme into this environment, the administration becomes an external environmental influence. This

significantly restricts the sphere of control of the educator. For the politician, the political conditions are no longer an external factor but are within their influence.

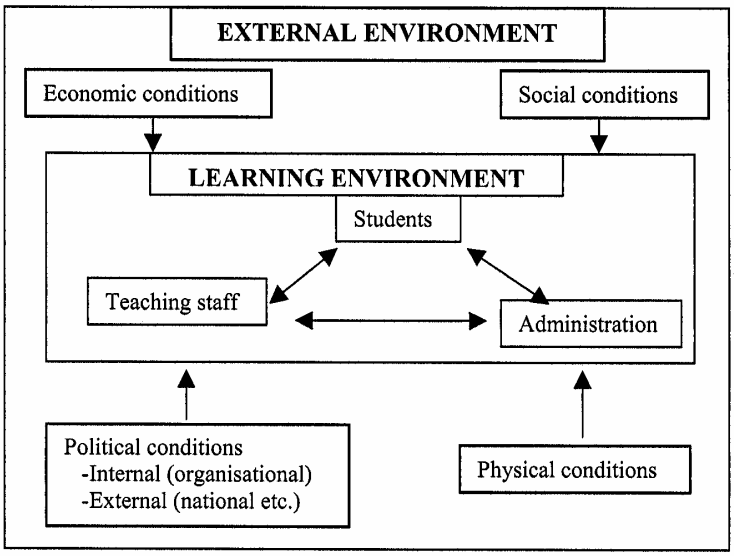

Figure 1 Model of the learning environment

Understanding the educational habitat: the realities of organisational management

In order to place the educational habitat in perspective, a brief insight into organisational and strategic management and group dynamics is given below.

The educational system

The reality of the educational system (formal and informal) is that is it comprised of numerous institutions; homes, offices, schools (Beer, 1974) and community organisations. These institutions are more than just 'things' or 'entities', but are "dynamic and surviving systems" (Beer, 1974, p.3). The systems comprise related parts connected together to produce a certain structure and functionality. As in all systems, there are inputs and outputs. The inputs are the time, energies and resources of family, community and professionals. The outputs are generally the measure of the success or effectiveness of the system.

The formal and informal systems are inextricably linked. The outputs of the institutions of the formal educational system are our young people, or perhaps adults returning to further their studies in some way. The outputs of the informal education system; the home and community, are the citizens produced. The health of the formal educational system could be measured or equated to the quality of the individuals leaving the system. In these days of competency based learning, this equates to grades issued against a long checklist of criteria, or learning outcomes, in each subject at school, university or college. Grades issued at school demonstrate measurable outcomes in various subjects but do not as yet provide our young people with a certificate of 'Environmental Awareness' or 'Sustainable Living'. However, even if these were included in the award list it is sad, but realistic, that one needs to formalise the fundamental skills which one generation should be able to pass on informally to the next. The school curriculum is full today, focusing on students' immediate future with little time for subjects or topics not immediately useful. It is the age-old problem, focus on the NOW at the

expense of the future…which is exactly where the natural environment, and efforts in sustainability education, might lose out.

What would be the community reaction if bulldozers were to approach a stand of native forest, raze it to the ground, clear the land, and then leave it? What would be the outcry if the last remaining 200 Asian lions residing in the Gir Forest in India were to be abandoned to their fate, and poachers, with the reason being the low numbers signify a low value. 'Extinction' of educational 'species' is common in the educational environment where colleges, courses/programmes low in numbers (not 'financially' viable) are closed despite the fact that they provide essential skills for a small group of people. The vagaries of human nature are such that people will not necessarily change their outlook on the educational environment, no matter what the importance.

The organisation in action

An insight into the realities of current educational management is vital for those planning sustainability education programs. Figure 2a below demonstrates an organisation[1] in action. Each of the members of the organisation is represented sitting atop a pole, holding on to pieces of elastic attached to a single tennis ball that represents the output, or performance, of the system (Beer, 1974). The members contribute to the work of the organisation by pulling on the elastic to stabilise the ball. Stabilisation reflects the optimum output of this system.

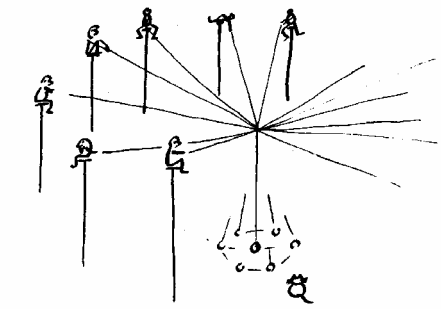

Figure 2a The organisation in action.

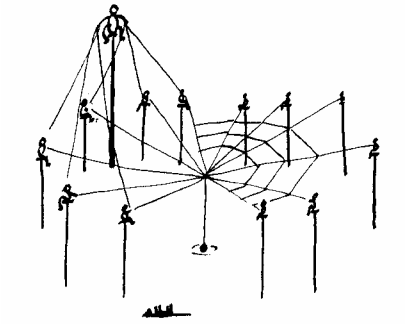

Figure 2b Stabilising the system (Beer, 1974, pp.15 & 16).

There are all sorts of tensions implicit in the relationships of the individuals in this dynamic system. In reality, the players in an organisation will have different lengths and widths of elastic, and have to contend with external factors such as wind blowing the ball (representing politics, economic factors etc.), or the odd stray cat giving the ball a good knock. An unstable system may result from individuals having too much freedom to pull in their own directions or from other influences on the stability of the system. In an organisation where there is good communication and efficiency the players pull correctly on the strings to still the ball and thus maximise the output.

Organisations employ a variety of ways to cope with the constant perturbation of the system (the 'cat's paw syndrome'). Some put in taller poles, connect some of the smaller poles to each tall pole and the man on the tall pole instructs his subordinates to

[1] 'Organisation' here encompasses educational institutions, councils, or any organisation that has a formal structure.

coordinate them (Figure 2b). Freedom is thus subordinated to efficiency. Secondly they might put in a number of rigid connections (called 'rules') between the elastic threads to reduce the variety (ie. movement). However, the cat will continue to be a menace, or someone might hit the ball to create instability so that the whole system collapses. The third method used by institutions is to shoot the cat, thereby forcing those with whom it interacts into stereotypes (Beer, 1974). Not much fun for the cat! but effective for the organisation.

The relevance of this illustration for environmental educators is that bureaucracy is alive and well, and breeding in an institution near you. If your environmental program is not an integrated part of the overall output of the system, it could seen as another ball attached to the existing output ball, unbalancing it and thus creating more challenges for those attempting to control the system. One reaction to this by the top pole dwellers (the 'bureaucracy) is likely to be to 'kill the cat'; cutting off the offending programme to return the system to some sort of perceived stability.

Lessons learned from the study of strategic management can assist sustainability educators to understand how organisations work, and thus how best to integrate sustainability programs into an existing organisation. What matters to a manager is the 'performance' of the organisation i.e. financial dimensions such as cost levels, return of profit etc. and operational dimensions such as quality and service levels (Stacey, 1996). Decisions will be made to enhance the performance of the organisation. Thus, if environmental education programs are to be successfully introduced, they must be an integral part of, and enhance performance objectives. The Vision and Mission statements of an organisation are a good place to start to get an indication of the focus of the organisation, its paradigm or belief system, needs and how one might integrate environmental education programs into the existing habitat.

Group dynamics

An understanding of group dynamics is useful to environmental educators when dealing with informal or formal groups and also to understand the behaviour of individuals within an institution. Some basic facts about groups (Hellriegel, Slocum and Woodman, 1989; Rush, 1969) are: groups exist within organisations/institutions and mobilise powerful forces that affect individuals. It is beyond the scope of this paper to go into group dynamics in detail, but attention is drawn to some key concepts that can be explored further.

Hellriegel, Slocum and Woodman (1989) identify seven factors that influence group behaviours and outputs: Member composition and roles, Size, Norms, Goals, Cohesiveness, Leadership, External environment. The norms are rules of behaviour that have been accepted as appropriate by members of a group. Environmental educators entering an existing organisation are likely to find themselves facing the norms of that group (which may or may not corroborate the goals of the organisation). Group norms are likely to be more influential than the management standards (Hellriegel, Slocum and Woodman, 1989). It explains partly why people behave in a certain way, and why they perhaps do not follow sustainable living guidelines despite knowing what to do and how important it is (Klomp, 2004).

Introducing adaptive management principles

Adaptive management techniques have been used (Lee, 1999; Allan and Curtis, 2003a) in natural resource management in an attempt to manage the uncertainty and complexity

associated with natural resource management. Adaptive management is based on learning from management actions in order to improve the next stage of management (Allan and Curtis, 2003a)[2]. Techniques from adaptive management have been adapted for use in the educational environment (Buchan and Buchan, 2003). It is felt these will be particularly beneficial in the implementation of sustainability education programmes that are still in their relative infancy, with attendant uncertainty and changes. The author has developed an Adaptive Management Conceptual Framework (Figure 3) to assist environmental educators to manage the inevitable change within the educational habitat.

Evolutionary adaptive management describes a trial and error approach to management, while passive adaptive management uses lessons from the past to develop a single best policy to apply in practice (Allan and Curtis, 2003; 2003a). Active adaptive management is advocated for use in sustainability education. Active adaptive management "*…is a designed, purposeful and reflexive system that grows, assesses and builds the capacity of stakeholders to manage change*" (Allan and Curtis, 2003a). In the current formal and informal educational systems, the one certainty is that there will be change as a result of the external and internal environmental factors (Figure 2).

The Adaptive Management Conceptual Framework is designed for use at all levels, from state to institution or community group. It is a powerful tool that can be used to guide the integration and implementation of programmes and curriculum into both institutions and community groups. The Framework outlines a four-step process:

1. benchmarking to assess the state of the learning environment;
2. application of a management strategy to inform decisions;
3. action to invoke changes to the learning environment; and
4. monitoring to assess the effectiveness of the action in achieving the desired outcomes and to inform future action.

These steps are described in detail in a previously published paper (Buchan and Buchan, 2003).

The first step, **Benchmarking,** ensures that benchmarks are set, measured and reviewed. The NSW Environmental Education Plan outlines performance indicators and monitoring processes to measure the effectiveness of environmental education at different levels. These are, however, limited to assessing the effectiveness of the Plan, and the feedback process is limited to reporting to Government with little provision made for action and change as a result of the monitoring and report-back.

The **Management Strategy** (Step 2) chosen here is based on four principles of environmental decision making (Bates, 1995) so that sustainability educators view and manage their education programmes and/or systems in the way that they advocate people should live.

[2] While adaptive management has lots of promise and is relatively widely used in natural resource management, reviews of the success of its implementation (Allan and Curtis, 2003; Allan and Curtis, 2002; Lee, 1999; Johnson, 1999) do urge caution to educators contemplating its use, but the experience of others can hopefully ensure the success of the implementation of adaptive management into sustainability education.

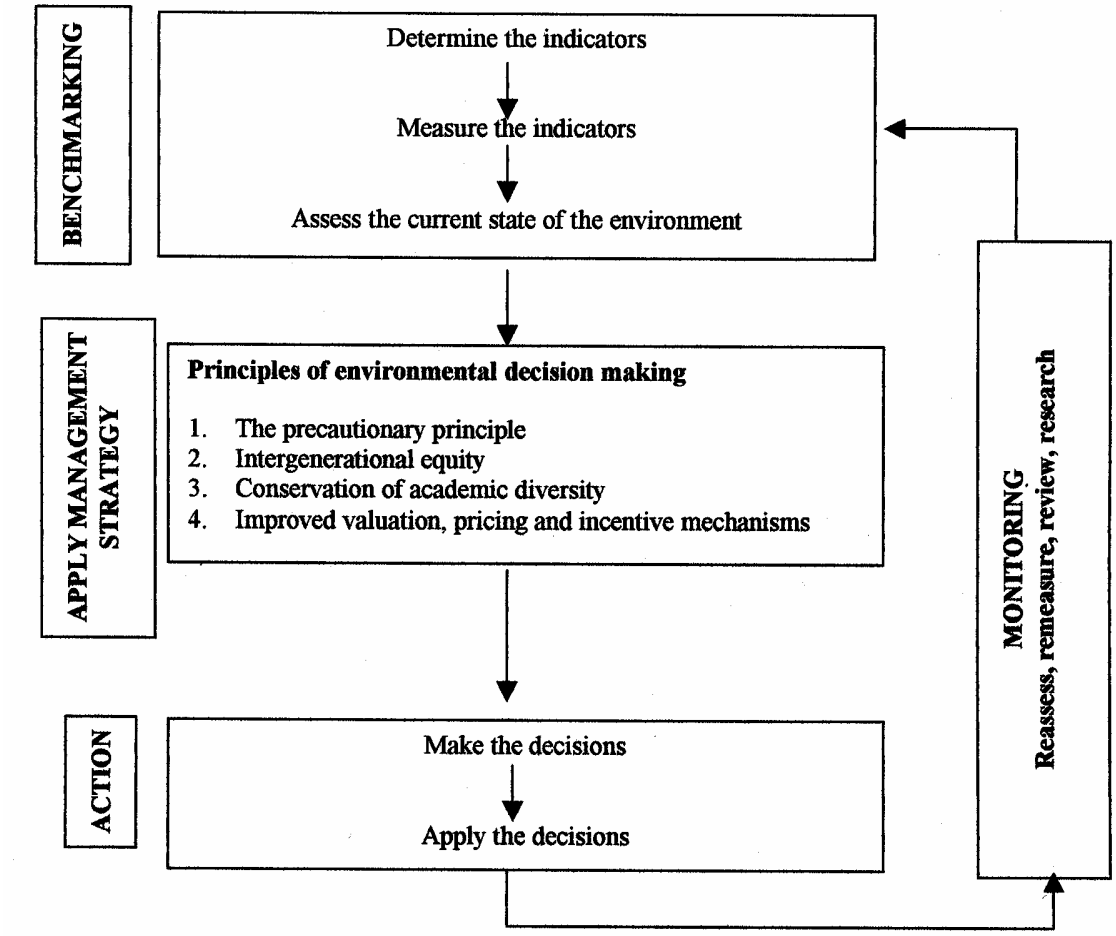

Figure 3 An Adaptive Management Conceptual Framework

For educational management, the first principle, the **precautionary principle** could be stated thus: *Take precautionary measures until you have determined the consequences of any environmental action on the many facets of the learning environment* (Buchan and Buchan, 2003). The significance of this principle is to prevent the administration and individuals making decisions about sustainability education programs where the impact of the decision is uncertain. For example, a common practice is for administration to use course enrolments as an indicator of course viability. Low enrolment or attendance numbers are not necessarily an indicator of a less valuable 'resource', simply indicative of a small population. *If we equated the value of the natural environment with population numbers, how then would our endangered species fair?*

A simple explanation of the second principle, **intergenerational equity,** applied to sustainable development is "*development that meets the needs of the present without compromising the ability of future generations to meet their own needs*" (Beder, 2000). The essence of intergenerational equity in the learning environment is that one should have a moral obligation to provide for future generations that have no say in today's decisions. Options need to be kept open and diversity maintained to keep sufficient flexibility in the educational and social system in order to adapt to current and future changes. This is particularly important with respect to sustainability education needs.

For the purposes of application to learning environments, **conservation of biological diversity** (principle 3) can be translated into conservation of academic diversity. Agricultural experience in cropping has shown the dangers of monoculture (growing a single plant species). Monoculture in the environmental educational habitat is equally risky. While a single mode of delivery, or style of environmental programme might be successful for a given audience at any one time, as soon as there is some external environmental change (funding withdrawal or political pressures etc.) the educational programme becomes a threatened species facing extinction.

The final principle in used in the management strategy is to **improve valuation, pricing and incentive mechanisms**. To assist the decision-making process, one must put a value on education. The value of education is strongly culturally and individually biased. This is the real challenge for environmental sustainability educators; not only placing a value on sustainability education, but getting the receivers of that education to value it.

After taking the management decisions, Step 3 in the Framework is to actively carry out those decisions. Perhaps the most important step is the fourth and final step in the adaptive management conceptual framework, the **monitoring process**. Monitoring involves reassessment of the current state of the environment and re-measuring indicator performance to test the effectiveness of the decisions and to make necessary changes to practices based on the monitoring outcomes.

Conclusion

In order to successfully introduce a biological species to a given habitat, a thorough understanding of the dynamics of the system and the needs of the species is required. Like our environment, organisations, institutions, communities and families are dynamic systems. The 'species' being introduced are the sustainability environmental education programmes. If environmental education programmes are to work, they themselves must be sustainable in the long term, and adaptable to the changing needs of individuals and society.

This paper has given lecturers, teachers and community educators guidelines to define their own educational habitat and to understand the external environmental factors influencing their learning environment (Figure 1). A brief insight into the realities and constraints of organisational management that underlie the formal and informal educational habitat demonstrates the number of management intricacies that impact on sustainability education programmes.

The concept of integrating environmental education, in particular sustainability education, into the formal system is relatively new, as this conference highlights. In order to guide the development of sustainability programmes to cater for inevitable change and uncertainty, adaptive management principles from natural resource management have been introduced in the form of an *Adaptive Management Conceptual Framework.* As environmental educators we need to be open to change and the lessons learned from the review of current practices in this evolving field (Lee, 1999; Shindler and Cheek, 1999; Allan and Curtis, 2003). It is hoped that this paper has given environmental educator's food for thought when planning the most appropriate way to introduce environmental education programmes to the community in the current educational habitat.

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