Familiarity breeds context – delivering environmental education through local awareness

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Abstract

With community concerns about environmental issues such as global warming receiving scientific and political priority, there is a corresponding demand for mainstream environmental education initiatives. The plethora of information available regarding broad environmental issues can be intimidating to educators keen to foster an informed sense of stewardship in their students. We discuss how using local examples to illustrate more general environmental science provides a sensible and necessary approach to environmental education. Natural resource management based on sound science requires a knowledge of local biodiversity and sustainable agriculture. We present a case study in Far North Queensland where the Regional NRM body (Terrain NRM) facilitates partnerships with community and industry groups to provide teachers with access to relevant and accurate information, providing support and building capacity for educators. We describe how local learnings at the catchment scale build social capital around community awareness and vitality.

Introduction

Terrain Natural Resource Management (NRM), a non-profit organisation, is one of 56 bodies across Australia responsible for protecting and managing Australia's natural resources. Queensland has twelve regional NRM bodies in fourteen regions. The regional bodies are run by boards that represent a wide range of community interests, employing paid staff and volunteers. The bodies are responsible for developing regional plans, accredited by both State and Federal governments, that identify the major NRM issues in the region, outlining strategies for addressing them and specifying the contributions of stakeholders. The Regional bodies obtain and provide funds for on-ground projects to implement the plan.

Like many other regional bodies, Terrain NRM, as part of their regional plan, has identified community awareness and engagement as one of their highest priority goals:

> "A community that is knowledgeable and informed of natural and cultural resource management and conservation issues and which actively participates in the sustainable management and conservation of natural and cultural resources in the region." *Sustaining the Wet Tropics: A Regional Plan for Natural Resource Management 2004-2008*. FNQ NRM Ltd & Rainforest CRC (2004)

Thus, Terrain NRM has a vested interest in partnering with educational institutions to facilitate the incorporation and delivery of regionally relevant information about NRM issues in sustainable education programs. Building these 'communication corridors' has been crucial for capacity building across the Wet Tropics and Queensland education communities.

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Why go local?

The use of local examples to provide context for general pedagogy has been shown to improve environmental education outcomes and student performances across other disciplines. In their examination of connections between childhood involvement with the natural environment and adult environmentalism, Wells and Lekies (2006) contend that children who participated in 'wild' nature activities such as hiking or camping were more likely as adults to not only express positive attitudes to their environment, but also actively engage in pro-environment behaviours. Factors that decreased or did not contribute to behavioural changes included participation with more 'domestic' activities such as harvesting vegetables or planting, and time spent in nature with others (e.g. parents, teachers, siblings). The authors speculated that the reduction in positive behavioural changes may be due to a lack of spontaneity involved in these factors. When local (rather than exotic or remote) examples are used in the classroom, children have a much greater likelihood of encountering these outside the classroom, when they are more likely to experience greater independent and informal interaction with the material. Ham (2007a) notes that if we wish to influence attitudes about a place or concept (e.g. biodiversity), we must first influence the beliefs a person holds about that same thing. This is where the provision of relevant and timely information to children about our natural world can begin to make an impact on their attitudes later in life.

Richard Louv (2008), author of Last Child in the Woods, and founder of the No Child Left Inside, notes a growing body of research indicating that direct exposure to nature is essential for healthy childhood development and for the physical and emotional health of children and adults. Children are wired this generation and many in urban landscapes physically removed from nature. Nature-deficit disorder is linked to some of the most disturbing childhood trends, such as the rises in obesity, attention disorders, and depression (Louv, 2008).

As the regional body for NRM, our education program is strongly focused on facilitating the exchange of local knowledge. People with a sound understanding of local issues have a much greater likelihood of and capacity for responsible stewardship of natural resources.

> "…interpreters who make compelling presentations of strongly **relevant** themes stand the greatest chance of having enduring impacts on their audiences." – Sam H. Ham (2007b) (our emphasis)

Stewart (2006) argues passionately for the embedding of the curriculum of environmental education in local environmental issues, basing the pedagogy on an appreciation of local biodiversity. He cites the inability of the general public to name more than a handful of local species (trees, birds, mammals, insects or any other life form) as an indication of gaps in Australian environmental education. He suggests that a fundamental principle of "first know your surroundings" underpins values of care for people and nature. This is supported by other authors including the work of Lindemann-Matthies (2005) who found that the more 'wild' (common local) plants and animals the children noticed, the more they appreciated these species. She noted that both teachers and students enjoyed the 'nature on the way to school' program which provided students with direct experience in the local environment (Lindemann-Matthies 2006). Mike Weilbacher (1993) noted that without a relationship with local organisms in their local environment, people might not notice what happens to them, bemoaning the decline of 'outdoors' experiences and studies of individual species with the move towards education about big-picture issues.

In developing a teaching unit about education for sustainability for pre-service teachers, Kennelly and Taylor (2007) acknowledge that whilst factual knowledge in education for sustainability (EFS) is important, they were more concerned with the processes of learning than with the acquisition of factual information. The authors note that during the course of a 30-40 year career, teachers would have to cope with ever changing information about the environment. Our program of supporting teachers at the school level with locally relevant regional expertise complements this approach.

Whilst involving local community sources of information provides many benefits to educators, it is important that the scientific integrity of knowledge gained is maintained. ERO's can access current best practices through the partnerships that regional NRM bodies have with scientific institutions such as CSIRO.

In this paper, we document our attempts as a regional NRM body to engage and support educators in the region to provide relevant and accurate information to their students via existing community resources.

There is a need for environmental education initiatives to be designed more strategically. Learning programs designed for targeted audiences relating to the ways in which they contribute or could potentially contribute to specific environmental problems is crucial. Though numerous environmental issues today are commonly shared across nations (climate change being of particular concern), mobilising participation, knowledge and empowerment for individuals to act to address environmental problems is easiest through local concerns.

> "Formal and non-formal EE must respond by organizing themselves to reach these strategic audiences, both in time and space, with carefully developed messages tailored to the interests, tendencies and preferences of each audience and targeted at the specific problematic behaviours in question. It represents a change from viewing and practicing EE as more or less a voice piece for "loving and respecting nature," to viewing and practicing EE as a more systematic and planned persuasive communication program (Ham, 1997)."

Designing programs in which behaviours can be identified, connections easily accessible and tangible results allows for greater interaction. This requires a demonstration of relevance to the individual. Using local examples provides this link. Climate change, national resource management issues are all remote to children and they need to see the relevance to their current lives, and in addition, the relevance of any local actions they take to the bigger picture.

Environmental education is enhanced by the integration of NRM regional initiatives across Australia. Planning for regional management is supported by a rich, evidence-based, body of literature which supports the ideas of why local? The NRM Act (2004) recognised that local councils play a pivotal role in providing environmental management and services to their communities as they are able to provide connections. Local government is to be recognised as a key participant in NRM, especially on account of its close connections to the community, community needs and concerns and opportunity for community participation. School populations represent a significant sector of the community. Recognising the education community and the valuable role they play in our local communities' capacity building around environmental issues is significant.

Past environmental education initiatives were often based on building environmental knowledge solely in order to protect it. Integrating a more self-interested approach and applying in a local context allows learners to incorporate their understanding of nature as part of their own self development. Walking in the woods, smelling the roses, and digging in the dirt are good for mental health, learning, and brain development. Being close to nature may

foster people's ability to concentrate, improves the behaviour of children with attention disorders, and boosts science test scores (Louv, 2007). A California Department of Education study from 2005 showed that sixth-graders improved their science scores by 27 percent after taking week-long outdoor education classes.

Harvard naturalist Edward O. Wilson observations support the idea that nature teaches children how to learn if understood within their local context. Wilson coined the term "biophilia", defining it as "an innate tendency - an instinct if you wish - to affiliate with nature, to observe it, to live near it, to understand it, to have it within reach." Integrating environmental education programs that incorporate our 'innate tendencies' can only strengthen our connections between classrooms and community.

The Terrain Education Program

The involvement of the NRM regional body focuses primarily on providing a communication corridor between community NRM resources and educators, mainly school teachers. The intent of our programs is to build capacity for teachers to implement and maintain a sustained NRM education program.

Like the ecosystems we strive to sustain, our resources are limited. There are only three part-time Education Resource Officers (EROs) to cover the Wet Tropics region, and we therefore seek to optimize our outcomes via sustainable delivery mechanisms. Our primary focus so far has been professional development workshops for educators (largely teachers, although we recognise that other members of the school and general community may share this role). In this way, we hope to reach more students through a multiplier effect than we would by working directly with classes. Interestingly, this appears to be an unexpected approach, as our EROs frequently receive requests from teachers to speak directly to the students.

In 2007, the Terrain Education team developed and delivered five professional development workshops around the themes biodiversity and sustainable agriculture. Usually, there were about 20 participants, one third of whom were 'Community in the Classroom' (CinC) representatives ('expert' speakers), and the remaining two-thirds were primary and high school teachers. The CinC representatives spoke for ten minutes each, with a focus on how they could assist teachers with classroom programs or information. Participants received relevant local material, often combined in one manual, and were invited to provide comprehensive feedback on their experience, expectations and requirements.

Such workshops, whilst intense experiences for all involved, were overwhelmingly rated positively by those who attended, most meeting or exceeding their stated expectations 100% of the time.

> "It is good to be able to access information from professionals who are keen to help as we are all aware that teaching children and helping make them aware of their environments and how to sustain a healthy environment." – Participant, *Sustainable Agriculture in the Wet Tropics* Workshop, Innisfail 12 September 2007.
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> "Another excellent workshop with a focus on hard data, current practices and educational idea – other groups could learn from your excellent format and informative speakers" – Participant, *Sustainable Agriculture in the Wet Tropics* Workshop, Innisfail 12 September 2007.

The workshops are by necessity kept short to minimize non-contact time for staff; this is not necessarily a bad thing and the non-interactive format, whilst of concern to us as facilitators, was universally supported in feedback:

> "I appreciate getting a large amount of information efficiently and am happy to sit, I don't need interactivity" – Participant, *Sustainable Agriculture in the Wet Tropics Workshop*, Innisfail 12 September 2007

Recognising that familiarity with local flora and fauna is the first step in appreciating the importance of our biodiversity asset, Terrain has promoted the development of local biodiversity resources. Seldom do existing resources highlight readily identified or accessible examples and features of flora or fauna at the catchment level. As a result, it is not uncommon for children to learn about South American or African animals before they have studied Australian animals, in spite of the fact that the Wet Tropics is considered an international biodiversity hotspot! Similarly, some early primary students studied the endangered pandas for Threatened Species Day, without realising there are actually fewer cassowaries (a local icon) left in the wild than pandas in China. Though this paper is not aimed at implying any support or opposition to Australia's debate on a national school-based curriculum, the risk of such to environmental educators is the loss of immediate and practical application between classroom and "outside" application to instil lifetime practices. Regional Bodies are ideally placed to access a combination of the knowledge of both the scientific community and the local landcare/catchment groups to fill this void. A manual and online identification guide to 'desirable locals' (local native plant species that are common and readily identifiable) has been produced (www.picasaweb.google.com/desirablelocals) for one of the catchments in the region.

One of the benefits of raising awareness of local flora in this way is the increased popularity of local native plant species in school gardens. Such plantings, which may take the form of frog, butterfly, bird or bushfood gardens not only have positive impacts on local biodiversity and weed management, but also provide teachers with a readily available resource from which to conduct future lessons, regardless of the paucity of the physical environment in or around the school. Again, educational resources that are linked to these very specific local species are required.

Participants at the workshops continually confirmed that resources in hardcopy were appreciated because they could be easily shared and discussed:

> "Able to pass on to other interested parties"…"I showed this ['Desirable Locals' workbook] to a friend and she was fascinated by info (e.g. nectaries, etc.)" – Participant, *Disturbed by Larry* Workshop, Innisfail 19 March 2007.

> "Workbook is handy in getting other teachers interested." – Participant, *Sustainable Agriculture in the Wet Tropics Workshop*, Innisfail 12 September 2007

It is not, however, the intention of our Education Program to produce resources. There is no shortage of excellent resources available, although the mere logistics of sifting through the bounty is daunting enough to deter some educators from engaging with the material. The role of the ERO's is to assist in this process and provide a stepping stone to an appropriate level of support for the needs of educators locally. For example, the Wet Tropics Management Authority produced a freely available CDROM 'Rainforest Explorer' (also available online at http://www.wettropics.gov.au/st/rainforest_explorer/index.htm) in 2006; this brings together a wealth of educational material relevant to the Wet Tropics and linked to the current Queensland school curriculum. This single resource is heavily promoted since it provides a one-stop shop for local educators.

When community resources are used to supplement curriculum materials, quality control is important. As the facilitator of the CinC resources, regional NRM bodies must ensure that teachers are provided with expert assistance that emphasises and expands on the scientific

principles in the information being relayed. For example, a presentation on organic farming can lead to discussions about pesticide chemistry, biodiversity, soil chemistry and structure, botany, weeds etc. Simply listening to one person describe their practices is of little value if it is not contextualized or related to bigger issues. Our workshops try to provide teachers with a balanced range of CinC contacts as well as background information that is linked to curriculum activities.

A scientific approach to NRM education also ensures that issues are discussed, as much as possible, impartially. Because of the systems nature of NRM, involving complex social and environmental connections, it is necessary to understand and minimize the tendency to see various components of the system as 'good' or 'bad', e.g. planting gardens to encourage 'beautiful' butterflies is a popular activity in schools that is at odds with the disdain experienced, usually by adults, at the discovery of 'ugly' caterpillars! Similarly, labelling certain plant species as 'weeds' runs into difficulty when they turn out to be part of the local native biodiversity. In this case, simply discussing factual information, such as whether or not a plant 'belongs' to a particular ecosystem, and acknowledging our own resource management requirements (e.g. this species is necessary for agriculture, or to temporarily rehabilitate a degraded ecosystem), allows students to take a holistic and scientific approach to complex problem solving. The regional bodies, by the very nature of their partnerships, have access to information based on input from the general and scientific communities.

Because NRM necessarily does not solely revolve around traditional environmental concerns but also encompasses social and economic issues, ERO's also distribute information and conduct workshops on sustainable agriculture. The same rationale applies to the inclusion of local knowledge in agricultural education as with environmental themes. Whilst agriculture is obviously an important component of the Wet Tropics community, it is no less necessary to communities in more urban settings and is readily demonstrated through popular teaching tools such as vegetable gardens and farm visits. Again, the important principle is ensuring the information is locally relevant, whether the community is urban or rural.

In the Wet Tropics, for example, in spite of the dominance of the sugarcane and banana industries to the local economy, these are not routinely included in agricultural lessons by teachers, who defer to the traditionally more familiar chicken and cattle farming systems. Resource material in the manual accompanying the workshop, *Sustainable Agriculture in the Wet Tropics*, contained locally-sourced information regarding the sugar and banana industries, including the botany of the plants and historical information. On a more general level, workshop participants were directed to Agaware modules, developed by the Agaware Group in consultation the Queensland Studies Authority, which provide excellent links to curriculum-based activities about sustainable agriculture.

We do not currently monitor output directly from students but receive information from teachers. Students who experience well-structured workshops accessing sound scientific information via community experts demonstrate their ability to understand and relay complex ecological issues.

> "We are not putting the frogs in the frog ponds ourselves because they could spread a virus and we would like to attract frogs instead of taking them out of their natural habitat" – Student, *Planting Demonstration Afternoon, Mourilyan State School* Innisfail 23 November 2007

In a couple of other schools, students expressed concern about conflicting messages received where revegetation plantings have been done, but months later being asked by teachers not involved in the usual classroom programs to remove 'weeds' that the students were now able to identify as local native plants regenerating naturally under the resultant developing canopy. Whilst these inconsistencies are currently problematic, a systemic approach to embedding

sustainable, locally relevant NRM education in the curriculum will address these concerns in time.

Successful NRM education using local emphasis in schools has many flow-on effects to the general community, which meets one of the primary goals of the regional NRM body. Almost surreptitiously, the knowledge gained by educators has more than one application:

> "I found them [resources provided] useful not only as a teacher, but as a parent as well. Great education resources are available!" – Participant, *Disturbed by Larry* Workshop, Innisfail 19 March 2007.

> "I have planted many of the 'desirables' in our school garden. Teaching students about native/local fauna." – Participant, commenting six months after attending the *Disturbed by Larry* Workshop.

> "Sustainable agriculture practices are important but agricultural education is an important general area of study, the end result is not necessarily agriculturalists" – Participant, *Sustainable Environments* Workshop, Atherton 3 November 2007.

> "I've been doing more 'eco friendly' lessons and some of the kids have even encouraged their grandparents to buy Macarangas and Bleeding Hearts from the nursery as a result of them." – email from Supply Teacher, Babinda 31 May 2007.

Conclusion

Monitoring our success is difficult due to academic and capacity constraints; so far, our assessments of attitudinal and short-term behavioural changes are anecdotal. In the spirit of systems research, we believe that our role in facilitating improved community knowledge of the complex human and ecological systems that constitute NRM requires a constant cycle of thinking, acting and learning together with educators and NRM stakeholders. As we progress towards more efficient and targeted methods of delivery, we are aware that we need to ensure local NRM issues are a priority for our communities and future land managers, as well as refining monitoring and evaluation tools that capture the elusive and subtle changes we hope to make.

Keywords: natural resource management, capacity building, education, natural history, local, environment, sustainable agriculture.

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