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Popular Education for Water Sustainability: Three Lessons from Reflective Practice

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Abstract: Between them, the authors of this paper have over sixty years experience in water education working in primary and secondary schools, universities, field study centres, professional development programs; and with community, industry, and government groups, focusing on coastal zones and catchments. Over the last three years, they have undertaken a systematic process of personal and dialogic reflection and deliberation on this experience, particularly in the area of popular education. This paper presents three key water education lessons gained from this iterative process and provides examples to justify the sagacity of this choice. First and foremost, popular water educators really need to know their participants, what is important to them, why, and what they know already. Second, popular water educators should give their participants an opportunity to share with others what they have learned about water. Lastly, metaphorically speaking, popular educators need to focus their practice on the head, the heart, and the hands. Knowledge, emotion, and action are dialectically interrelated. Integrating them in popular water education is a challenging yet satisfying task that can have significant outcomes.

Keywords: *Popular education, community outreach, watershed management*

This paper focuses on the role of popular education in integrated water management. It outlines three lessons gained from practice. Education is one of a range of tools that water resources managers can use to improve the sustainability of ways people interact with water, waterways, catchments and coastal zones. Over the last thirty years, many different tools have been used in an effort to improve the sustainability of water management, including legislation and regulation, market-based instruments, marketing and communication programs, and improved technology and end-of-pipe solutions. Governments have introduced environmental management legislation (e.g., Queensland Government 1994; Queensland Government 2000). Economists have advocated innovative ways of valuing our ecosystems and the services they provide us (e.g., Costanza et al. 1987). Marketing and communication experts have communicated messages tailored to specific audiences (e.g., Kennedy 2010). Researchers have discovered more about the actual nature of water problems and opportunities that confront us and how best to manage them (e.g., eWater Cooperative Research Centre 2012). While each of these groups of tools undoubtedly plays a part in sustainable water management, it has been the experience of the authors and others (e.g., Cosgrove, Evans, and Yancken 1994) that a thoughtfully developed, context-specific mix of tools is necessary, if water management is to be improved in any given situation.

So education, while not the answer, is definitely part of the answer.

An Education Dialogue and Critical Reflections on Practice

Both authors have worked as educators at key times in their careers. Bill was born, raised and educated in the United States and trained in marine science. Peter is Australian; his rather eclectic academic background has spanned land use management, ecology, education, and social science. Bill has worked primarily in research and university teaching. Peter has worked as a researcher, but has spent much of his professional career working as a

teacher in field, community, school, and university settings. Peter has also spent some fifteen years working as a volunteer and government-employed extension officer supporting community-based natural resource management groups working in catchment management and Landcare. They met in 1997 when Peter visited Bill at his laboratories at The University of Queensland seeking causes of a cyanobacterial bloom of *Lyngbya majuscula* that was infesting northern Moreton Bay, south-east Queensland. Peter was working on a state government catchment management initiative with commercial fishers. The commercial fishers had been forced to fish in the Lyngbya bloom area after being excluded by new government regulations from fishing in nearby Pumicestone Passage.

Bill and Peter found they held similar ideas about the importance of involving stakeholders, participants who really had something to gain or lose, in learning about the cyanobacterial bloom and how best to manage it. Despite their different backgrounds, they both saw education as important, particularly in terms of them learning together with stakeholders. Further on in their careers, Bill and Peter have had the opportunity to reflect systematically on their practice, including on this case study. The popular education lessons presented in this paper form part of the findings of a larger reflective practice project they have undertaken over the last three years. The methodology used to derive this publication and this paper is presented below, as are two concepts – reflective practice and popular education.

Initially, Bill and Peter had a series of discussions on general topics that related to their work in catchment and coastal management. They told relevant stories from their varied experience, asking each other questions and seeking points of commonality and difference as to what they had done, why it was important to them and what they learned from that experience. They initially talked using Skype, with conversations lasting two to three hours. On several subsequent occasions they talked face-to-face, looking and probing more deeply into what they have learned in their working lives to date and seeking lessons that could guide them into the future.

Peter and Bill analyzed texts of their conversations, following the advice of Schön (1983) reflecting on their practice in the hope that the outputs of this reflection would not only guide their future practice, but that the process and the outcomes may also be of use to others. They coded transcripts systematically, looking for themes and using these outputs to inform further dialogue. This interactive, dialogic process was punctuated by considerable periods in which the authors were apart, allowing time for both individual reflection and subsequent deliberation and agreement on key lessons when authors came together to discuss their individual analyses (Miles and Huberman 1994). This paper presents key lessons they have gained in popular education for water sustainability.

Reflective Practice

Osterman (1990) sees reflective practice as an individual task of reflecting on one's own work and experiences so that the individual may improve themselves in their area of expertise. Forester (1999) talks of deliberative practice and considers this as an extension of reflective practice in which practitioners work, reflect, and learn collectively with others. In a sense, the work presented here has been both reflective and deliberative in that the authors have reflected individually and then deliberated on what they have learned and how they can further improve their practice as a result of this learning. For brevity, the term reflective practice is used to summarize this process. The authors take solace from the work of Schön (1983), who claims that competent practitioners in any field usually know more than they can say. They recognize that, over time, the origins of this knowledge can be difficult to determine. For example, we may learn things incidentally "on the job," such as how to use PowerPoint or write a consultancy report, and not view acquisition of these skills as "learning." However, these may be just as important as lessons from our academic studies (Schön 1983). The authors both value and enjoy working, deliberating, and learning collaboratively with stakeholders. This collaborative learning becomes a valuable source of knowledge and skill.

For example, in the *Lyngbya majuscula* case study they both learned much from the commercial fishers. These fishers had been disempowered. Their previous fishing grounds in Pumicestone Passage had been closed by the government and they found

themselves forced to make a living fishing in an unhealthy and unproductive cyanobacterial (blue green algal) bloom in adjacent Northern Moreton Bay. The work undertaken with these fishers bears many of the hallmarks of popular education, and it is to this topic that the discussion now turns.

Popular Education

Popular education differs from formal education one finds in institutions such as schools, universities and colleges. It focuses more strongly on the direct needs of the community (Whelan 2005), and seeks to empower those who may be socially, economically, or politically marginalized so that they may take control of their own learning and overcome the aspects of their situation that have caused this marginalization (Hale 2005). It is based on the methodology of education for critical consciousness first described by South American educator, Paulo Freire (1993), and has its origins in Marxist ideology and class analysis. It is conceptually aligned with critical social science which aims to enlighten, empower, and emancipate participants (Fay 1987). Popular education is a collective process in which, unlike formal education, the roles of teacher and learner are not well defined, as all participants at various times will be both a teacher and a student.

These popular education characteristics typify the work undertaken with the fishers. They had been politically marginalized in their dealings with government, and their new fishing grounds were detrimental to them economically, and in terms of their health (Savige 2012). The cyanobacterial blooms that occurred contained carcinogens. The blooms also caused skin rashes, and eye and breathing problems (Osborne, Webb, and Shaw 2001).

Bill's role was initially as a researcher and a teacher as he sought to find out more about the bloom, what caused it to grow and to share this knowledge with fishers and other interested folk. Peter was more the facilitator, focusing people's attention on the issue and bringing different parties together. This changed over time, as Bill and Peter learned much from the fishers who were excellent natural historians. The commercial fishers were close and accurate observers of nature. They had to be in order to make a living. Working together, Bill, Peter, and the fishers began to use the information they all gained about the bloom to advocate for local fishers. Research funding was gained from all levels of government, and a research team and steering committee were established. Media coverage of the bloom was widespread. Local government took steps to ensure that community health issues were managed by closing and cleaning beaches when blooms were prevalent. What occurred focused strongly on the direct needs of local people. The process was nonformal and informal, yet educational – all involved acted as both teachers and learners, at various times. The lessons gained were empowering and "of the people." This new knowledge and the support of the researchers empowered the fishers to advocate more strongly for their situation and the resolution of the economic and health problems they faced.

Education may contest or reinforce the status quo (Giroux 2001). Popular education, due to its change-oriented nature, seeks to address inequities and contest the institutions, cultural norms, or social and political systems that support these inequities, or allow them to exist. The Lyngbya case study is an example of both popular and informal education. Bill and Peter applied the method described above to this case study to reveal three key lessons that may be relevant for other popular educators working in nonformal settings. These are: know your participants; recognize that all involved are both teachers and learners; and focus on topics and activities that involve the head (thinking), the heart (emotions – music, art, dance), and the hands (practical activities) as means for participants to learn and use knowledge gained to address power inequities, or other problems that face them. These lessons are discussed below, using examples from the Lyngbya case study.

Three Lessons

Know Your Participants

As mentioned earlier, popular education focuses on the direct needs of the community and seeks to empower those, such as the fishers in the Lyngbya case study, who may be politically, socially, or economically marginalized (Hale 2005; Whelan 2005). As popular educators, the authors found it important to know their participants. This may seem

self-evident, so such a statement deserves some justification. Specifically, they found it important to know how the fishers defined (or "problematized") whatever had lead to their marginalization and how it affected them, others, and their surroundings; what was important to them in terms of the problem and why; what they knew already about the problem and what else they felt they may need to know; and what actions (if any) they felt should be taken to resolve this problem. These activities involved "walking in each other's shoes," as much as possible. Trust was also an important factor. Without trust, relationships falter and learning and action are impossible. Table 1 sets out some questions that may help to guide this reflection and learning and link them with key factors that help to describe the case study context. These questions and key context factors have been derived from the larger reflective project in which the authors are involved.

Space limitations preclude responding to all of the above questions in relation to this specific case study. The following discussion touches on five factors – knowledge, resources, empowerment, emotions, and equity.

In terms of knowledge, Bill spent a great deal of time on the water with fishers studying the bloom, in meetings and socially. He learned that the fishers were excellent observers of nature and seasonal, spatial, and other changes that were occurring in the marine ecosystem in which they were fishing. With the fishers' help Bill set about organizing needed resources and engaged the media to raise the public profile of this huge cyanobacterial bloom. They gained $AUD 600,000 in funding and in-kind support from political and departmental leaders in local, state, and federal government for urgent research to be undertaken to look at causes and management of the bloom. This was very empowering for the fishers.

Bill also came to understand emotional and equity issues relating to the bloom – whether the fishers thought what was happening was fair and how they felt. Over time cordial, trusting relationships developed between academics and fishers that helped to expose these aspects. Bill's wife, algologist Dr. Judy O'Neil, was part of the research team. Bill comments, "Judy was talking to the wife of one of the fishers. She explained that they were thinking of enrolling the kids in school next year and wondering, given the loss in catches due to the bloom, whether they would have the money to pay for tuition. What did Judy think they should do?" He found himself contrasting the worry and angst of the fisher's wife, against the demeanor of prospective researchers who were contacting him about their possible involvement in the Lyngbya research; some of whom he felt were simply seeking funding for their "pet" project, rather than focusing on really solving an environmental problem that fishers viewed as unfairly impacting on the lives of their families. Such conversations helped Bill develop greater empathy for the fishers and their plight. It did not mean that he became less objective in his Lyngbya research, but that he developed very similar motivations for solving the bloom problem as those of the fishers and their families.

Research undertaken as a result of Bill and the fishers' labors has discovered the causes of the Northern Moreton Bay Lyngbya bloom, and efforts have been undertaken to address them. Causes include "the presence of bio-available nutrients including iron, phosphorus, and nitrogen; dissolved organic matter; and favorable light, salinity and temperature conditions in the environment" (Queensland Government 2012). A Lyngbya Management Strategy has been developed, listing "agreed management actions for addressing the mitigation, investigation and catchment protection issues associated with Lyngbya blooms in Moreton Bay coastal waters, particularly in northern Deception Bay" (Moreton Bay Catchment and Waterways Partnership 2002: ii). However, due perhaps to the scale of the problem, at the time of writing, blooms are still occurring (Savige 2012).

The questions listed in Table 1 have been gained from an analysis of a wide variety of popular education examples in which the authors have been involved. Responding to them also helps to shed considerable light on this particular example. Being an effective popular educator involves knowing your participants very well and allowing them to also know you, not just as a researcher or teacher, but as a person. It is indeed important to walk in each other's shoes. Participants have much to learn from each other, as discussed below.

Table 1. Questions and key context factors to guide reflection.

Questions	Key context factors
What do participants know?	Knowledge
What do participants believe?	Beliefs
How much do participants care?	Emotions
Do participants think what is happening is fair? Why?	Equity
Do participants agree on the nature of the problem? What else might they need to know?	Problem consensus
Do participants feel able to act? Why?	Empowerment
Do participants agree on what needs to be done?	Action consensus
Do participants have what is needed to solve the problem? What else may they need?	Resources
Do participants have the knowledge and skills to solve the problem? How might they gain necessary skills and knowledge?	Technical capacity

Teachers and Learners

This lesson follows on from the first question stated in Table 1 – in terms of knowledge what do participants know? Many participants want to share with others what they know about the problem at hand. Our job as educators is to provide this opportunity. At various times participants take on different roles as "teachers" and "learners." However, for popular education to be effective, we need to learn together. Many participants want to share with others. We all need the opportunity both to teach and learn about what is important to us.

Bill was very keen to learn as much as he could about the Lyngbya blooms. Typically, there are several ways to do this including library research, literature reviews, communicating with other academic experts, and undertaking laboratory and field research. Bill chose an additional path. He decided to learn what he could from the fishers. They were the "on-water" (rather than "on-ground") experts on this particular Lyngbya bloom. Bill took a relationship-based rather than formal approach to do this. He went out on the water to inspect the bloom with them. Notably, he went in their boats. This was important both symbolically and practically. In terms of power, they were the captains. They were in charge. They were the teachers. Significantly, at another time, he went to the local bowls club with the fishers. They shared food and drank beer. The fishers became the teachers and Bill the student. The fishers were "at home," in their own environment. Bill and the fishers became co-researchers, learning together and freely sharing and critiquing what they were learning about the bloom. In this example, power was redistributed and shared within the researcher-fisher relationship. They developed a common, shared motivation. It became obvious to all involved that Bill was not just there to write another research paper or score another grant to further his career. He wanted to manage the bloom, to control it so that the fishers could still make a living fishing in the area (Savige 2012). Like Freire (1993), Bill felt that research grounded in local understanding, consistent with local motivations and involved those affected by research outcomes as active co-researchers and co-learners, had more chance of success. As mentioned earlier, sharing motivation with the fishers involved sharing emotion – for example, realizing that poor fish catches result in little income and an inability to provide things like school fees for those you love. Bill and Peter contend (with others) that our emotional state impacts on how and what we learn, and what we do as a consequence (Pedler 2011; Pekrun 1992). The following section uses the Lyngbya case study to explore the relationship between learning, emotion, and action.

Head, Heart, and Hands

"Head," "heart," and "hands" – thought, emotion, and action may be thought of as being dialectically (i.e., interactively) related. Thinking situated around such dialectical relationships has proven useful in counseling and community building (Kelly and Sewell 1988). The authors have also found it very useful in terms of popular and other forms of education. In the Lyngbya case study, the authors recognized that it was not useful, in fact impossible, for the fishers to compartmentalize their thinking, so that they thought "unemotionally" about the Lyngbya bloom and its impact on their lives. Emotion gives meaning. Emotion gives motivation. Emotion can drive people to learn and to act. While the fishers were understandably emotional and quite motivated to discover the causes of the Lyngbya bloom and to remedy the situation, the authors found that the rest of the local community, including local and state government decision-makers, were often disinterested.

Through the local catchment association, the fishers put out a series of media releases about the bloom (Savige 2012). These received mixed responses from community members, with several people being very critical of the catchment association issuing media releases before long weekends. For example, the owner of a fast food shop on Bribie Island rang one of the fishers to tell him he didn't like him talking about the bloom in the paper. He felt that telling people about the bloom and working out how to manage its causes were important, but something that should not be done now, especially with the long weekend coming up. "We will lose trade" (Savige 2012)! He was not alone, real estate agents and accommodation business people also berated the catchment association president for going public about the bloom. Thought, emotion, and action can be linked in different ways and lead to different outcomes.

In response to this community feedback, Peter decided to implement a community education program. He sought to complement the research and popular education activities that Bill was leading and the catchment association media campaign. He wanted to make learning about the bloom, its causes, and the importance of sea grass meadows in coastal marine systems fun – not emotionally or economically threatening. So he devised a series of music and cartoon characters to convey these messages. These were pitched at young people, six to eight years old, the idea being that this would not be threatening or controversial. Adults were an important secondary audience. So, Doug the Dugong, and the Dugong Rock were born. Music from the Dugong Rock CD can be downloaded from the Healthy Waterways web site, see http://www.healthywaterways.org/HealthyWaterways/Resources/CommunityServiceAnnouncement.aspx. On Dugong Rock, Doug sings:

I'm Doug, I'm a dugong and I live in the bay
For years there man it's been OK
You really gotta' dig the Dugong scene
We eat sea grass, sweet and green
But the waters goin' muddy
The light is dim
There's not much sea grass
The future's grim
And all I want to do is the Dugong Rock!

Doug's song contains key messages about sea grass and managing coastal ecosystems. Figure 1 shows Doug the Dugong as a cartoon character. He figured in a coloring competition in the local paper, the Near North Coast News, with Dugong Rock CDs for prizes. Doug the Dugong developed a public profile. His character has had longevity. He lives on from the time of this work (1997 to 2000) to today and can be heard on the soundtracks of current videos on YouTube. In 2003, Dugong Rock – The Musical played at the

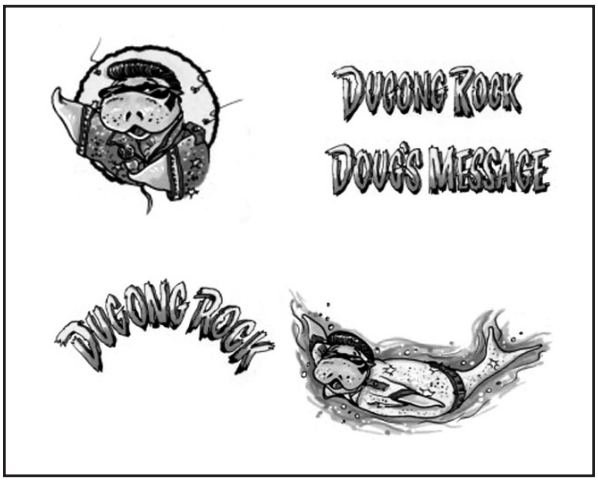

Figure 1. Doug the Dugong – a cartoon character.

Woodford Folk Festival at the children's part of the festival, as well as at other locations around southeast Queensland.

Over time, with the help of the media, school and other public education activities relating to research, such as those outlined above, public awareness of Lyngbya blooms in Moreton Bay has risen. While pre-surveys and post-surveys of the impact of these activities on general levels of public awareness are not available, a current google search (25 May 2012) using the key terms – *Lyngbya majuscula* and Moreton Bay, revealed 6,090 results. A google search of the phrase "Doug the Dugong" revealed 160 results, with a YouTube search using "Dugong Rock" revealing the posting of 20 videos with a total of 14,656 hits. Interestingly, others have also thought it useful to adopt a similar approach with the Burnett-Mary Regional Group, even going to the extent of purchasing an $8,000 human-size dugong suit so they could undertake similar types of activities in Hervey Bay (see www.bmrg.org.au). This life-size walking dugong figures in two video clips and a community service announcement about Hervey Bay and associated stream catchments (Smith 2012). This is an example of popular education and community education finding ways to focus, motivate and energize participants in what Freire (1993) terms "conscientization," "knowing reality in order to better transform it" (Lather 1986: 67). The Lyngbya case study highlights that knowledge, emotion, and action are linked in ways that can be both positive and negative. The work of the Burnett-Mary Regional Group lends validity to this assertion. Being aware of this and consciously linking knowledge, emotion, and action can greatly help popular educators to be effective in their work.

In Conclusion

This paper uses the experiences of the authors, and the work of others, to reflect on popular education for water sustainability using a case study involving research, education, and community action on a *Lyngbya majuscula* bloom in northern Moreton Bay, southeast Queensland, Australia. The authors have undertaken a process of systematic personal and dialogic reflection and deliberation on this case study, to reveal three key lessons in terms of popular education. First, know your participants. Walk in their shoes. While this may appear self-evident, reflection and action on this point are fundamental to all educational activity. Such reflection should focus on the following context factors: knowledge, beliefs, emotions, equity, problem consensus (whether participants define the problem in the same way), empowerment, action consensus (whether participants agree on what action needs to be taken to resolve the problem), resources, and technical capacity. Second, when it comes to working as popular educators, we are all learners. We are all teachers. We need to learn from each other and evaluate knowledge and the purpose to which it should be put by working together. Lyngbya blooms are complex. Understanding and managing such blooms are complex activities. No one will know everything about such an occurrence, and people will perceive the impact of such a bloom upon their lives and their surroundings in different ways. It is only by working together that we can paint a rich picture to inform action. Finally, in all this there is an important place for emotion. What is important to our hearts, will impact our thoughts and knowledge, and what action we take to remedy our situation. We should not ignore the fact that knowledge, emotion, and action are dialectically related. As popular educators we have much to gain from sharing what is in our hearts with others.

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