LISTENING TO KIDS: DEVELOPING AN INCLUSIVE EVALUATION PROCESS FOR ENVIRONMENTAL EDUCATION

By

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Abstract

Environmental education (EE) is thought to be integral to a sustainable future. Environmental education program evaluation can lead to greater program success, outcome verification, program improvement, and can be used to illustrate success to funders, policy makers, and decision makers (Thomson & Hoffman, 2003). Children are often the intended recipients of environmental education programs. However, seldom are they involved in the evaluation of such programs. This research sought to develop an action research evaluation model that included children as participants in an evaluation of two marine based EE programs in Victoria, British Columbia, Canada. The study found that learners have important and relevant details to share about their education experiences. It suggests that hands-on learning experiences in nature are critical for the development of ecoliteracy. However, this study also identified challenges with evaluation of environmental education programs and participatory approaches to evaluation.
Dedication

This research is dedicated to all of those fantastic individuals all over the planet that make small efforts every day to make our world a better place.
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Note

To protect the identity of the participants and schools involved in this research, all names have been altered. While their names may be fictitious, their stories represent their true insights.
INTRODUCTION

Background

On a fall afternoon, a group of youngsters raise their paddles in unison and propel their dragon boat across the calm waters of the Esquimalt Lagoon. An eagle soars above Victoria’s skyline on the horizon. In a quiet corner of the lagoon, swans, ducks, and cormorants feed under the watchful eye of a second group of classmates. Suddenly, excited chatter and oohs and ahhs fill the air. The students in the dragon boat have discovered the sand dollar bed beneath them. Later whilst tossing dredges from the dock and excitedly measuring the salinity of the estuary, the students theorize about what they will find in their plankton tow samples.

Across town, a group of students leave their classroom bound for the library. Enroute, they gather around the Seaquaria (a large aquarium filled with local marine organisms) in the school’s foyer. Eyes grow wide as the students discover that overnight new things have appeared in the habitat. An informed impromptu discussion arises…What is it? Did something hatch? Are those like the things we saw at the beach?

Stories like these unfold everyday in the Seachange Ecorowing (Ecorowing) and Seaquaria in Schools (Seaquaria) programs, two place-based environmental education (EE) initiatives that seek to connect school children in Victoria, British Columbia with the marine environment around them.

Place-based EE is defined by Powers (2004) and Sobel (2004) as a pedagogy that focuses on integrating the learning experience within the natural and human resources
surrounding the learning community. Based on anecdotal evidence, thousands of students have had the opportunity to participate in the programs and the executive directors of both *Seaquaria* and *Ecorowing* feel that their programs are a tremendous success. They are however, quick to acknowledge that until now no formal program evaluation had taken place. A lack of program evaluation is not uncommon in EE programs (Fien, Scott, & Tilbury, 2001; Thomson & Hoffman, 2003). Yet formal evaluation is increasingly demanded, as funders, school board administrators, academics, policy makers and other organizations seek “proof” of program successes in a format and structure to which they can relate (Hussar, Schwartz, Boiselle & Noam, 2008; Posavac & Carey, 2007; Thomson & Hoffman, 2003).

This study begins to bridge the gap between “knowing” about success and attempting to “prove” success in a manner that reflects the collaborative, student-centred, and sense of community ideology fostered by both programs. The voices of the youth involved in this project have intentionally been preserved in detail. Additionally, where possible, emphasis is placed on sharing what the students feel is important in their learning. This is a deliberate attempt to increase the presence of youth voice and perspectives in EE research. It is my hope that by integrating the various perspectives of youth involved in the *Seaquaria* and *Ecorowing* programs, a more relevant and useful evaluation has taken place.

*Understanding The Programs*

While both the *Seaquaria* and *Ecorowing* programs strive to educate youth about their local marine environment; they are unique programs with substantial differences.
Both are supported by Pacific Project CRYSTAL\(^1\) and thus included in this study. The *Ecorowing* program consists of a daylong visit to a local marine ecosystem and follows a structured learning plan. The program is taught by experienced environmental educators with strong backgrounds in marine education. While the environment ensures that no visit to the lagoon identically mirrors another, in general, the program unfolds in a similar manner for each class. Additionally, the age groups that participate in *Ecorowing* are very analogous.

In contrast, the *Seaquaria* program is much more challenging to define. *Seaquaria* has placed aquariums filled with living marine animals in 29 elementary, middle and high schools across four school districts on southern Vancouver Island and the lower Mainland. Every school places them in different locations and every class engages with them in a different manner. There is no set program-wide learning plan, nor is there a defined timeframe during which the students engage with the *Seaquaria*. In some schools students interact with the *Seaquaria* during a senior biology class. In others it is utilized during an elementary language arts class, and at the other end of the spectrum some students simply interact with the *Seaquaria* in the elementary school foyer during lunch or before school on their own time. The *Seaquaria* program has a small team of paid

\(^{1}\) Located within the Education Department at the University of Victoria (UVic), Pacific Project CRYSTAL is one of five national Centres for Research in Youth, Science Teaching, and Learning supported by the Natural Sciences and Engineering Research Council of Canada (NSERC). The funding conditions of this research required an evaluation of both programs.
experienced marine educators and also works extensively with university interns and volunteers. Generally, the Seaquaria educators mentor a class in animal and habitat care, conduct at least one in class “Live Lab” (an event during which organisms are closely examined outside of the habitat in a hands-on manner) and often support teachers in a beach visit.

During my scoping interviews and thesis research I discovered that the term “Seaquaria program” means different things to different people involved with the program. Throughout my research I interviewed the program’s directors, various program educators, teachers and principals involved with the program and later the students; all defined the scope of the program differently. Some stated that the “Seaquaria program” is restricted to the lessons and learning centred around the Seaquaria tank, while others believe that it encompasses all marine education associated with the Seaquaria program; including beach trips, helping at a public marine outreach education centre, volunteering at public events such as Oceans Day and one-off special programs such as canoe trips on a local marine waterway or a trip to a local marine station. I discovered that people defined the scope of the program based on their experiences with the program. Initially, I envisioned that this research would only address Seaquaria education in elementary and middle schools. However, through the democratic and participatory nature of the research process, the participants expanded the focus to include a much broader program scope. This broader scope created a challenging evaluation scenario.
As a 30 year-old male, environmental educator, scientist and graduate student, I am very interested in the relationship between community and education, especially as it pertains to knowledge about the environment around us.

Based upon preliminary discussions with students, educators, teachers, and school administrators involved with both projects and my personal interest in effective EE, I attempted to develop an evaluation process that included children as equal participants. Program “success” is defined differently by different people, and I was especially interested in what youth valued about the Ecorowing and Seaquaria programs and why they valued those aspects. I began with a desire to explore how the Ecorowing and Seaquaria programs develop ecoliteracy and by extension foster ecological citizenship among youth. However, as the project evolved it became clear that if I solely focused on this element “I wouldn’t see the forest for the trees.”

Ecoliteracy can be considered a broad term that seeks to encompass the practice of creating an ecologically literate population, meaning a populous that lives with the natural world in a manner that mutually benefits humanity and the natural world alike (Stone & Barlow, 2005). Because it is such a broad term, there are differing definitions of ecological citizenship and ecoliteracy are deeply interconnected and not mutually exclusive and I have therefore chosen to explore both.

While I feel that ecoliteracy is a tremendously important initial step, I believe that ecological citizenship is the required catalyst for global change and action towards a sustainable future. However, I feel that ecological citizenship and ecoliteracy are deeply interconnected and not mutually exclusive and I have therefore chosen to explore both.
the term (Capra, 1999; Orr cited in Stone & Barlow, 2005; Smith, 2007). For the purpose of this study I have chosen to use the definition Capra (1999) presented in his Schumacher Society Lecture appropriately titled “Ecoliteracy: The Challenge for Education in the Next Century.” Capra defines ecoliteracy as an “ecological framework for educational reform” that is “based upon understanding the basic principles of ecology and being able to embody them in” our daily lives and communities (p. 2, 1999).

Ecological citizenship is defined by Clark and Stevenson (2003), Dobson (1998), MacPherson (2005), and Melo-Escrihuela (2008) as a form of citizenship that shifts the focus of humanity’s actions from an anthropocentric worldview to one that recognizes our place within a much greater biotic system and acknowledges the privileges, rights, and responsibilities that go along with such a relationship.

I chose to develop an evaluation process that tried to honor the importance of youth voices in their learning and include as many stakeholders as possible as active participants in the evaluation process because I felt that this was the only way to truly evaluate the success from all perspectives. To do this I conducted workshops with students, teachers, educators, principals, and school trustees. While I strived to ensure that the voices of the youth remained in the forefront, I have also attempted to illustrate commonalities between the different voices.

While my prior engagement with the Seaquaria program was limited, I was much more familiar with the Ecorowing program. I had participated in Ecorowing as a graduate student at RRU and I had helped teach several programs in the fall of 2008. Additionally, I received funding to undertake this research from the Natural and Engineering Science
Research Council (NSERC) Pacific Project CRYSTAL, which has a strong partnership with the Seaquaria and Ecorowing programs.

Research Objectives

This research was guided by the following research objectives:

• To develop a participatory evaluation model that seeks to empower and support the role of youth as equal participants.

• To pilot the evaluation model to provide a meaningful evaluation of ecoliteracy and ecological citizenship for the Seaquaria and Ecorowing programs.
Literature Review

Evaluation

The potential benefits of a formal evaluation exceed simply proving a program’s worth to funders and policy makers. Program evaluation can provide insight into program strengths and areas that need additional support, can improve program quality, can help determine outcomes, can clarify the vision of the program, can help a program achieve excellence and can provide a platform for the comparison of different programs (Fetterman, 2001; Hofreiter, Monroe & Stein, 2007; Hussar, Schwartz, Boiselle & Noam, 2008, Posavac and Carey. 2007; Stufflebeam, 2001; Thomson and Hoffman, 2003).

Program Evaluation in Environmental Education and Informal Learning Environments

A wide array of methodologies have been employed to assess the success and merit of learning experiences in informal learning environments. They range from structured pre/post testing to evaluate the impact of marine-based field trips on student learning (Cummins & Snively, 2000), to the use of art to understand children’s learning experiences during a program about tropical rainforests (Bowker, 2007). In a busy place such as Yellowstone National Park brief interviews have been used to understand the learning that takes place close to geysers (Brody, 2005). In contrast, another researcher conducted a series of comprehensive personal interviews with students throughout their academic year to evaluate their learning in an EE program (Hopwood, 2007) while others
have focused their efforts on developing instruments that convert teacher’s observations of student learning (Hofstein, Tamir, & Giddings, 1997).

Understanding the learning processes in informal learning environments can be challenging (Falk & Dierking, 2000; Thomson & Hoffman, 2003). Falk and Dierking (2000) felt that so many factors influence learning in museum environments that they developed a new model to specifically understand how children and families learn in such realms. In an attempt to further understand learners’ perspectives and program success, McDuff and Jacobson (2001) relied on participant driven research to evaluate EE in Kenya.

Two recent comprehensive studies: *Towards a Systematic Evidence-Base in Science out-of-school Time* (Hussar, Schwartz, Bioselle, & Noam, 2008) and *Framework for Evaluating Impacts of Informal Science Education Projects* (National Science Foundation, 2008) address evaluation of informal science education programs and highlight the need for a systematic evidence-base for initiatives such as the *SeaChange Ecorowing* and *Seaquaria in Schools* programs. Both studies note the importance of developing a broad, systematic evaluation system that can aid in the comparison of different programs. However, they also identify that new tools are needed, especially ones that are developmentally appropriate for young children (Hussar et al, 2008). Failure to promptly develop informal learning environment specific evaluation systems that respect the unique “framework of exploration, engagement and reasoning” could result in an imposition of systems “by outside forces” (Hussar et al, 2008, p. 40). There is a need for further developing indicators, tools, and research methodologies to broaden the evidence-base for EE (Thomson & Hoffman, 2003).
Place-based environmental education faces similar challenges to those described by Hussar, Schwartz, Bioselle, and Noam (2008). While research into place-based environmental education is a slowly growing field (Powers, 2004; Sobel, 2004), there remains an absence of a large body of research tools and evidence to help understand success in place-based education (Duffin & Powers, 2005).

Understanding Environmental Education

Central to evaluating place-based learning programs is understanding what Environmental Education (EE) is, and to define excellence in EE. Various definitions of EE have been suggested, revised, and debated since its formal inception at Earth Day in 1970 (Gottlieb, 1993; NEEAC, 1996; Thomson and Hoffman, 2003; Staniforth and Fawcett, 1994; UNESCO, 1976; UNESCO, 1978; UNESCO, 1992). According to Thomson and Hoffman’s (2003) summary of EE definitions, EE has three key components: creating awareness about the environment and one’s relationship with it, developing a deeper understanding of the environment and how things work, and that the combination of awareness and understanding will create the capacity for individuals to engage with the environment in a constructive manner.

The National Environmental Education Advisory Council (NEEAC), a coalition of non-governmental EE organizations, defines EE to be “the process that creates awareness and understanding of the relationships between humans and their many environments – natural, man-made, cultural, and technological. EE is concerned with knowledge, values, and attitudes, and has as its aim responsible environmental behavior” (NEEAC, 1996, cited in Thomson & Hoffman, 2003, p. 7). Staniforth and Fawcett (1994)
echo the definition of the NEEAC (1996) but also suggest that EE should foster the capacity to help individuals find solutions to environmental problems. Suggesting that EE should include learning how to fix environmental problems is ethically challenging because it places burden on future generations to fix past ills that they may have had no part in creating, instead of focusing on discovering the world around us and learning how to live with it in a sustainable manner (Sobel, 1996).

For the purpose of this study, I propose a definition of EE that expands on the NEEAC (1996) definition. I define Environmental Education, within the context of this study, as the process that fosters awareness and understanding of the relationships, interdependence, and responsibilities that human beings and living organisms share with one another and their many environments. By helping create an understanding of these fundamental connections, I contend that EE helps build a platform for environmentally responsible citizenship.

*Excellence in Environmental Education*

Defining *excellence* in EE is also challenging. According to the North American Association of Environmental Educators (NAAEE), excellence demands a learner-centered, cooperative, active learning community where students are given authentic opportunities to develop their own understandings through hands-on and minds-on activities that foster independent and critical thinking (NAAEE, 1996). Thomson and Hoffman (2003) suggest that EE should be based on credible information and clearly outline biases and values.

Considering the great social and environmental challenges society and the planet are currently facing, there has never been a greater need for excellence in EE. Program
evaluation can be an effective tool to help to ensure excellence (Thomson and Hoffman, 2003). But what aspects of a program should be evaluated and how? What are the measures of excellence? And who decides what to evaluate? As Fien, Scott and Tilbury (2001) noted in their evaluation of the Worldwide Fund for Nature (WWF) global educational programs, one of the greatest challenges of their research was to determine what to evaluate and how to evaluate it. Ultimately, they elected to try and evaluate the actual conservation impacts the programs were having by using interviews, case studies and conservation data analysis (Fien, Scott, & Tilbury, 2001).

The Need for this Study

The question of how and what to evaluate is typically tackled by professional adults. Few studies explore the question of how to evaluate excellence in EE from the perspective of children (Nagel, 2004). This is a serious gap. Currently, over one third of the population on earth is below 19 years of age. By 2025, this population group will swell to 2.56 billion, an increase of roughly three times the population of Canada (UN Population Secretariat, 2008). Increasing the opportunities for the voices of youth to be heard within their own communities and for their ideas to be heard about what interests influence their learning and futures, have been identified as an important steps towards global democratic and environmental stability (Barratt Hacking, Barratt, & Scott, 2007; 2005 UN census records indicate a current global youth (0-19 years) population of 2.45 billion, this is projected to grow to 2.56 billion youth by 2025. The current population of Canada is thought to be 33.5 million (UN Population Secretariat, 2008).

Freeman (1996) suggests that we (as adults) need to ensure that:

The child who is capable of forming his or her own views should be able to express those views freely in matters affecting him or her, the views of the child being given due weight in accordance with their age and maturity (Freeman, 1996 in Rudduck and Flutter, 2000, p. 78).

Addressing the power of pupil perspectives in evidence-based practice, Wood (2003) observes that “while pupils are often the key stakeholders in education, rarely are their voices seriously taken into account in policies devised to improve teaching, learning and achievement” (p. 366). EE research is no different (Rickinson, 2001; Nagel, 2004). Nagel (2004) proposes that “while research has examined curriculum development, pedagogy, professional development and research methodology, there appears to be a gap in the literature focusing on the educative experiences of the young people EE espouses to inform” (p. 119). On a similar note Hopwood (2007) explains that in order to better understand environmental learning, “we must pay greater attention to the role of the learner as an active agent in EE” (p. 462). This active learning role engages and empowers youth (Hoffman & Staniforth, 2007).

**Youth Voice**

Suggesting a need to honor student perspectives in education is not new. John Dewey first raised the importance of acknowledging students’ opinions about curricula in
1938, stating that “students should be involved in the formation of the purposes that
govern their schooling” (cited in Nicholls, Nelson & Gleaves, 1995, p. 253). However,
Rudduck & Flutter (2000) argue that to fully “understand the attitudes to pupil
participation and pupil voice we have to…look at the progress of the children’s rights
movement” and acknowledge that “children’s rights have mainly but not exclusively,
been argued for by adults on behalf of pupils” (p. 76). Rudduck and Flutter (2000) caution
that processes that honor pupil participation and perspectives must also be accompanied
by a “readiness among adults to hear and take seriously” what children have to say (p. 76). When society fails to recognize the voices of youth, we are prone to adultism.

Adultism is defined by Bell (2000) to exist when adults make decisions that
directly affect youth without involving them in the decision making process because they
feel that they are superior to youth. Bell (2000) writes that “our society, for the most part,
considers young people to be less important than and inferior to adults. It does not take
young people seriously and does not include them as decision makers in the broader life
of their communities” (p.1). In an attempt to counter adultism, a small but growing
number of researchers have used several youth-specific evaluation approaches including
student action research (Rubin & Jones, 2007), youth empowerment evaluation (Walker,
2007), and youth participatory evaluation (Sabo Flores, 2008) to evaluate various
initiatives.

The main participants in the Ecorowing and Seaquaria programs are youth.
Drawing upon the work of Lane, Lucas, Vanclay, Henry and Coates (2005), and,
Hacking, Barratt and Scott (2007), I feel that evaluation of EE programs that involve
youth should extend beyond simply evaluating what is being learned and should also
support the advancement of children’s voices in the community. Thus, the evaluation described in this study was specifically designed to give student-voices equal status with adult participants.

**Participatory Evaluation**

There are several ways to increase participant voices during an evaluation process. One methodology that has been successfully used in EE evaluation is participatory evaluation (McDuff & Jacobson, 2001). While participatory evaluation is generally understood to involve a high degree of stakeholder participation in the evaluation process it is a broad term that has been defined differently by different scholars in different disciplines. (McDuff & Jacobson, 2001; Sabo-Flores, 2008; Quintanilla & Packard, 2002). McDuff and Jacobson (2001) suggest that participatory evaluation involves stakeholders in the design and evaluation process. Researching within the classic school environments, Cousins and Earl (1995) define participatory evaluation as a process that involves having an expert train “key organizational personnel” in evaluation research (p.8). Wilmsen (2008) describes participatory research in natural resource management programs in a manner that strongly parallels EE participatory evaluation. Others caution that some participatory methods could be considered superficial and lead to tokenism (Kara, 1997; Sabo-Flores, 2008).

Participatory evaluation has also been used in diverse settings including evaluating the success of an inner-city science enrichment program (Quintanilla and Packard, 2002), within the formal education system (Cousins and Earl, 1995) and to study children’s organizations in rural Nepal (Hart and Rajbhandary, 2003).
Youth Participatory Evaluation

A recent youth-specific offshoot of participatory evaluation has emerged over the past few years (Sabo Flores, 2008). Youth participatory evaluation is rooted in a social activist stance that seeks to foster an inclusive process, empower youth, create relevant research, and involve young people in meaningful ways in their community (Sabo Flores, 2008). It differs from classical participatory research because it is often youth led or led by a team of youth with coaching from an evaluation expert. Programs that have employed youth participatory evaluation have been found to become more “democratic and inclusive of young people’s views, perspectives, and power” (Sabo Flores, 2008, p. 13). A recent study in Finland employed the principles of youth participatory evaluation to help plan an informal technology-education program with youth (Randolph & Eronen, 2007). Researchers found that not only was the program successfully planned, they also confirmed that youth that have been given appropriate coaching and instruction are fully capable of performing complex program planning and development (Randolph & Eronen, 2007; Sabo-Flores, 2008).

In their review of youth participation in community research Checkoway and Richards-Schuster (2003) determined five key outcomes of such initiatives. They discovered that when youth are given the opportunity to participate in community research it helps them develop “knowledge for social action,” that it helps “young people exercise their political rights” especially as it pertains to the United Nations Conventions of the Rights of a Child, that it allows youth to “share in the democratization of knowledge,” and thereby helps prepare them for “active participation in a democratic society,” and lastly that it helps “strengthen the social development of young people”
However, they also echo the work of other researchers and suggest that the failure of society and researchers to properly acknowledge and act upon youth research outcomes can have a negative effect on youth and be disempowering (Sommer, 2001, cited in Sabo-Flores, 2008; Walker, 2007).

Empowerment Evaluation

Another form of evaluation that seeks to advance participant voice is empowerment evaluation. It was developed to respond to a need to evaluate programs in a manner that gives voice to the individuals involved with the programs and to bridge the gap between participants and policy makers (Fetterman, 2001). The emphasis on creating open communication between all parties involved, in conjunction with enabling organizations to adopt an inclusive evaluation into their program design and structure, is felt to empower an organization towards excellence and greater success. Collaboration, participation, and empowerment are central themes upon which empowerment evaluation is based (Fetterman, 2001). Originally developed by socially concerned scholars, empowerment evaluation “has its roots in community psychology, action anthropology, and action research” (Fetterman, 2001, p. 10).

Empowerment evaluation has been successfully used by organizations such as: the National Aeronautics and Space Administration (NASA), the Centre for Disease Control, inner-city youth programs, HIV/AIDS prevention organizations, and has been adopted by large non-profit funding agencies such as the W. K. Kellogg Foundation (Fetterman, 2001). A recent study by NASA, to evaluate their experiential Mars Rover Educational Program involving high school students and NASA engineers, found that “empowerment evaluation paired with experiential education, allows both program staff
and program participants to learn by doing, to improve their understanding of the program, and to enhance the overall experience” (Fetterman & Bowman, 2002, p.295). The evaluation was found to reinforce the learning process and the information gleaned during the evaluation from students, teachers, mentors and educators was used to make program improvements (Fetterman & Bowman, 2002, p.295).

It is important to note that while Empowerment Evaluation is designed to help empower people, “no one empowers anyone – including empowerment evaluations – people empower themselves” rather “empowerment evaluations help create an environment conducive to the development of empowerment” (Fetterman and Wandersman, 2007, p. 182).

Empowerment evaluation has not been widely used in environmental education (personal communication, 2009). However, its proven success within informal learning environments, within diverse cultural and geographic settings, as well as its fundamental premise of being participant driven, make it an interesting methodology to explore with children and within EE contexts.
RESEARCH METHODOLOGY

General Framework

The qualitative study that I have undertaken is a form of action research. Action research is understood to be a disciplined form of inquiry that is based upon a collaborative, democratic, and participatory process that seeks not only to research, but also to inspire action (Cohen, Manion & Morrision, 2000; Kemmis & Wilkinson, 1998). It has been extensively used in researching educational settings including EE (Atweh, Kemmis & Weeks, 1998; Cohen, Manion & Morrision, 2000; Gayford, 2002; Kemmis & Wilkinson, 1998; Kwan & So, 2008; Lijmbach, Archen, Van Koppen & Wals, 2002; Moore, 2005; Mordock & Krasny, 2001).

One of my greatest desires was to be involved in an evaluation that helps facilitate change, as opposed to merely conducting an evaluation that will sit on a shelf. I wanted to develop a process that is relevant, useful and of value for small, often understaffed EE organizations and their program participants. Cohen, Manion, and Morrision (2000) describe action research as a “powerful tool for change and improvement at a local level” (p.226). This is further supported by Kemmis and McTaggart (1992) who point out that not only is action research concerned with changing individuals, it also focuses on understanding and changing institutional culture and society.

In a classroom setting, action research challenges the conventional research paradigm; “action research is not done on people…[it] involves research by people on their own work, to help them improve what they do, including how they work with and
for others” (Kemmis & McTaggart, 1992, p.21). This attribute is particularly applicable to EE programs such as Ecorowing and Seaquaria because it seeks to work with the students, educators, and teachers and leave an immediate legacy of insight and change.

In response to the call for a greater understanding of evidence-based practices in both informal science education and EE (Hussar, Schwartz, Bioselle, & Noam, 2008; National Science Foundation, 2008; Thomson & Hoffman, 2003), action research provides a credible process that features systems that other researchers will be able to understand, augment, and debate. Furthermore, because it is defined as a “flexible, situationally responsive methodology that offers rigour, authenticity and voice,” it is an ideal methodology to help build a bridge between academic research and grass-roots community EE initiatives (Cohen, Manion & Morrison, 2000, p. 241).

Lastly, commitment of action research to an accountable, participatory, democratic process that not only seeks to foster change but also to provide opportunities for reflection on the process as it unfolds, makes it a strong basis for developing and understanding a pilot EE evaluation process with youth.

Study Participants

This study involved two grade six classes from the Greater Victoria School District (SD #61) in Victoria, BC that had participated in Project CRYSTAL educational programming throughout the 2008-2009 school year. One class was selected to partake in the Ecorowing program evaluation, while the second was chosen to participate in the Seaquaria program evaluation. Due to the challenges involved in gaining sustained access to the students, the classes were not selected at random. Instead, the classes were selected based on suggestions from the respective program directors as to which teachers...
would be amicable to providing the opportunity to work with their classes. Because the workshops took place in the final weeks of the school year, scheduling conflicts presented a serious challenge. Thus the initially targeted *Seaquaria* class was unable to partake, and a substitute class was selected. While the *Ecorowing* class had only participated in that particular program, the *Seaquaria* class had also partaken in the *Ecorowing* program during their school year. This research was sanctioned by an extensive ethics review process by SD #61 and was undertaken with the written and expressed consent of the students, their parents/ legal guardians, respective teachers and school principals.

In addition to the research undertaken with the *Seaquaria* class, a workshop was also held with 26 program educators, teachers, principals, school trustees, representatives from Pacific Project CRYSTAL, volunteers and several high school students associated with the *Seaquaria* program. Participants for this workshop were recruited by email and word of mouth by the *Seaquaria* program director and staff.

A similar workshop was conducted for the *Ecorowing* program. However, a very low turnout (seven participants) necessitated a rapid format change and thus it became more like a focus group. Participants included teachers and program educators associated with the program. Reasons for the low turnout are unknown, but as the focus group took place during the final weeks of the school year, it is possible that teachers were simply overwhelmed with other commitments. Additionally, the *Ecorowing* program has struggled to receive consistent support from participating teachers and this may also have played a role (personal communication, 2009). Participants in the focus group included,
three program educators, including the executive director of the Ecorowing program; three teachers; and the director of the Seaquaria program.

The Participatory Challenge

While I found participatory research to be fantastic in theory, I found it much more challenging to implement. Ideally, I would have liked to have fully implemented youth participatory evaluation (Sabo Flores, 2008) for the work with the students, and empowerment evaluation (Fetterman, 2001) for the work with the adults. However, I was soon confronted with the reality that having participants develop, guide, and implement the entire evaluation project was completely unrealistic, especially considering that such a project would involve a tremendous amount of precious student and teacher time. Both of these evaluation methodologies consume substantial amounts of time and require participants to be able to commit to the process (Fetterman, 2001; Sabo Flores, 2008).

Evaluating the Seaquaria and Ecorowing programs utilizing youth participatory evaluation could be potentially feasible if spread out over an entire school year and conducted by a teacher who can incorporate the activities and lessons into the curriculum. I feel that it is not realistic for an external researcher to do so and I am unsure whether it is fair to ask students to sacrifice significant learning time in order to participate.

I found myself confronted by a situation whereby I was forced to compromise some of the principles of participatory evaluation. It was not possible to have the participants design the research question (as in part, it was defined by the funders of this research and by my own academic interests). There was insufficient time to allow the participants to design the project; and it was impossible to ask the participants to analyze,
write-up and implement the results. Therefore, I developed an evaluation methodology that drew upon the principles of action research, youth participatory evaluation, and empowerment evaluation. I ensured that the participation of the students was entirely voluntary, and that the students had an opportunity to define how someone should work with them. I developed a methodology that allowed the students to vote on and direct what was discussed and tried to preserve and honor their voices and stories. Additionally, the methodology I developed provided students with the opportunity to directly express their thoughts about the program (both supportive and constructive) with the program educators and their respective teachers. Similarly, the educators’ workshop and focus group allowed the participants to dictate the topics, the nature of the discussion, and the identification of challenges and solutions. However, despite being based upon the principles of participatory evaluation methodologies, I fully concede that the evaluation framework used in this research fails to employ some of the fundamental principles of participatory and empowerment evaluation. This model is an attempt to address the need for effective tools for evaluation of place-based education, honor the need for an increase in youth voice in EE research, and ensure that the model is practical for conventional classroom use.

The Evaluation Process

The evaluation model is based upon some of the principles of youth participatory evaluation (Sabo Flores, 2008), and empowerment evaluation (Fetterman, 2001). The purpose of this type of model is not only to acquire qualitative data, but also to encourage dialogue, community, and partnership throughout the process. The model consists of a
series of activities, within an interactive workshop setting, involving art, theatre, games, group brainstorming, discussions and democratic rating techniques (Fetterman, 2001; Sabo Flores, 2008).

I had originally designed the model to include three one-hour classroom workshops with the students for each of the respective programs. However, scheduling three one-hour classroom sessions or their equivalent, proved to be impossible in the busy middle school context. Therefore, the model was adapted to include only two one-hour classroom sessions for this project. The first student workshop involved only the students and myself. The second student workshop involved the students, their teacher, myself and program educators, mentors, or administrators involved in their educational experience.

During my preliminary scoping of this project, and during my attendance at two program specific professional development days, it became clear to me that there are conflicts and barriers to program success that are not student related. These included concerns about a lack of funding support, insufficient professional development funding, teacher/administration conflicts, and the absence of school board support. This created an ethical challenge in my research as I was committed to ensuring youth participation throughout the process, but I also wanted to respect the rights of youth and children to not be burdened by issues over which they have little control or responsibility. Therefore, in addition to the classroom learning community workshops I have also included a two-hour educator specific workshop/focus group in the evaluation model to ensure that the necessary dialogue can take place.
Evaluation Framework

The flowchart below (Fig. 1) describes the general evaluation framework designed for this project.

Figure 1. Flowchart of Evaluation Framework for Place-Based EE

Student Workshop #1

1. Explain evaluation and the proposed project, and provide time for questions.
2. Ask students whether they are interested in participating.
3. Audio record all workshops and take detailed notes.
4. Develop guidelines for how the class expects someone to work with them and what you collectively expect from them.
5. Use a variety of brainstorming, theatre and art activities to explore program evaluation in depth, and to help students understand the task at hand.
6. Use a variety of brainstorming, theatre and art activities to develop a list of activities and significant learning opportunities and experiences associated with the program. Developing this list can be considered “taking stock” of the program.
7. Use art to develop ‘pre-/post program cartoon’ self-portraits to help students recall their experience and to help them reflect on their learning. Ask students to draw a self-portrait of their heads and to illustrate or write a thought bubble featuring their thoughts about the ocean (Seaquaria program) or Esquimalt Lagoon prior to the Ecorowing program. Have students complete this by drawing...
a second self-portrait featuring their thoughts after they had completed the program and what they think of the ocean/Esquimalt Lagoon now.

Student Workshop #2

1. Invite class teacher and program educators to join class and form a learning community. Ensure that everyone understands the guidelines for working together.

2. Identify any missing activities or experiences on the “taking stock” list.

3. The ‘Voting Activity’: Distribute a set number of stick dots to each student, teacher, educator. Ask participants to stick the dots beside activities that mean the most to them, ones that they feel they learned the most through, or ones that they feel are the most important. (Participants may distribute the dots in whatever pattern they wish, the higher the number of dots, the more important the activity/experience is to them).

4. Process the results with the participants. Ask them “what things stand out to you?” etc. Probe deeper into answers and focus discussion on the topics that received the most votes but also ensure that discussion takes place about topics that received few or no votes.
Student Workshop #3

1. Invite participants to rate how well the top-ten activities/experiences are achieved by the program on a scale from 1-10 and transfer the results of this vote onto lists at the front of the class. Use these ratings as a platform for discussion.

2. Ask the participants how the ratings could be improved.

3. Provide time for unstructured program feedback and discussion

Educators Workshop

1. Identify a common vision or mission statement for the program. Through this exercise all participants will have a chance to hear one another’s understanding of the current vision or mission statement and a dialogue will follow to determine a common vision, which will hopefully allow individuals within different capacities in the program to understand the thoughts and positions of others.

2. Taking stock: this portion of the workshop involves listing all the activities/opportunities that the program does or creates. Individuals are then asked to assign value using a stick dot voting system, and rate the success of each activity or opportunity. Participants are then invited to explain their ratings; it is hoped that this dialogue will lead to further understanding and discussion.

3. Planning for the future: the final step is to look towards the future and ask participants to identify goals for each activity/opportunity in the Taking Stock portion of the workshop. Ask the learning community to collectively identify what kinds of strategies will be needed in order to accomplish the goals.
Data Analysis and Evaluation:

1. Transcribe, code and analyze all recorded data, notes and workshop activity results.
2. If possible, review preliminary results with participants. Alternatively an outside expert can be consulted to ensure correct interpretation of art, participant statements etc.
3. Determine themes, trends, commonalities, differences, areas of strength, and areas that need improvement.

Workshop Details

The tables below illustrate the layout, number of participants, nature of the participants and the length of the workshops and focus groups used during this research.

Table 1

Ecorowing Evaluation Workshops

<table>
<thead>
<tr>
<th>Title</th>
<th>Student Workshop #1</th>
<th>Student Workshop #2</th>
<th>Educators’ Focus Group</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Participants:</th>
<th>Students</th>
<th>Students, their teacher, <em>Ecorowing</em> program educator that worked with the students</th>
<th>Teachers involved with the <em>Ecorowing</em> program, program educators, program volunteers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Participants</td>
<td>27</td>
<td>29</td>
<td>7</td>
</tr>
<tr>
<td>Duration</td>
<td>55 minutes</td>
<td>55 minutes</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

### Table 2

*Seaquaria Evaluation Workshops*

<table>
<thead>
<tr>
<th>Title</th>
<th>Student Workshop #1</th>
<th>Student Workshop #2</th>
<th>Educators’ Workshop</th>
</tr>
</thead>
<tbody>
<tr>
<td>Participants:</td>
<td>Students</td>
<td>Students, their teacher, and two <em>Seaquaria</em> program educators that worked with the students</td>
<td>Teachers involved with the <em>Seaquaria</em> program, program educators, program volunteers, a school trustee, a principal,</td>
</tr>
</tbody>
</table>
a Project CRYSTAL representative, and three high school students who both participated in Seaquaria related programming and mentor younger grades within the Seaquaria program

<table>
<thead>
<tr>
<th>Number of Participants:</th>
<th>16</th>
<th>19</th>
<th>17</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration:</td>
<td>50 minutes</td>
<td>70 minutes</td>
<td>2 hours</td>
</tr>
</tbody>
</table>

*Example Brainstorming, Theatre, and Art Activities Used in the Workshops*

As mentioned previously, a series of brainstorming, theatre and art activities were used throughout the classroom workshops. I specifically designed these activities for this evaluation process. To provide further insight into the nature and intentions behind such
activities, I have provided detailed explanations of three of them below: 1) The Super Bike 2) Talking to an Alien and 3) Pre-/Post-Cartoon Activity: Time Machine.

Designing and Evaluating the Super Bike

• **Purpose:** To introduce evaluation concepts to students in a fun and relevant manner. To develop evaluation skills and understanding that can be used to express their positive and constructive feedback about the respective programs.

• **Activity:** As I stood in front of the classroom’s wipe board, I asked the students to help me design their ideal super bicycle (this was meant to be fun and crazy). I asked the students to share what components the bicycle should have and began to draw the bicycle on the board, adding components/ features as the students suggested them. The classes involved in this project developed fantastic bikes featuring rockets, stereos, creative musical horns, mountain bike suspension etc. Once we had collectively designed a satisfactory “super bike” I asked the class to imagine that we had sent the plans to a local factory. Several weeks later a huge box arrived at the school and the engineers at the factory wanted to know if this bicycle met the students’ needs and expectations. Thus we began a discussion about how we could figure out if the bicycle met their needs and how we could share this information with the engineers at the factory. The students suggested a whole host of different tests, experiments, observations, trials and ways that we could poll the class to receive feedback on the bicycle and test its worthiness. Additionally, the students shared creative and constructive ways about how we could share feedback with the engineers. While this activity was all play,
allowed me to illustrate evaluation concepts and provided an anchor point for later discussions about evaluating the *Seaquaria* and *Ecorowing* programs.

_Talking to an Alien_

- **Purpose:** To help students recall and reflect on past program experiences, and to help foster active student participation in subsequent discussions and activities.

- **Activity:** I asked the students to find a partner, one partner was an alien on a distant planet, the other was a person on Earth (participants switched roles in the second part of the activity). I asked students to pretend that the alien had never seen the ocean before (or the Esquimalt Lagoon), the students pretended that they were on the phone with one another. I asked the Earthling to explain in as much detail as possible about the ocean, or the Lagoon, to the Alien for 30 seconds. After 30 seconds, the students alternated roles. We debriefed the activity and recorded descriptions on a flip chart.

_Pre-/Post-Program Cartoon: Time Machine_

- **Purpose:** To help students understand their learning process and reflect upon their own learning. To provide additional information and insight into student experience for the researcher.

- **Activity:** I distributed a blank sheet of paper, and coloured markers, and asked the students to fold the paper in half. On one half I asked the students to draw a self-portrait of themselves or just their head, and then asked them to draw a cartoon thought bubble with their thoughts about the ocean or the Esquimalt Lagoon before the program expressed creatively with art or in writing. On the other half
of the paper I asked the students to draw the same self-portrait, but this time to insert their present thoughts about the ocean or the Esquimalt Lagoon. Additionally, I asked the students to ensure that their message was understandable, and if not, to include a sentence to explain their drawing if they felt that it might be difficult to understand.

Figure 2 and 3 provide examples of the Pre-/Post-Program Cartoons, the pages were folded in half, one side represents the thoughts of the respective students before the program, the other their thoughts and feelings after.
Figure 2. Example of an Ecorowing Pre/Post-Program Cartoon Drawing by a workshop participant.
Figure 3. Example of an Ecorowing Pre/Post-Program Cartoon Drawing by a workshop participant.
Data Collection

After the workshops, the agreed upon guidelines/expectations, vision/mission statements, the list of activities, the value and ratings of the individual activities, the goals for the future, artwork, and brainstorming results were all collected for analysis. All of the workshops were audio recorded using a digital recorder and external microphone. Notes and observations were made when possible, during the workshops, and immediately following the workshops.

Data Analysis

This research project generated a considerable volume of information. I transcribed all of the workshop audio recordings using the software program Transcriva (Version 2.014). Transcripts were repeatedly compared to the recordings to ensure accurate transcription and identification of participants. The results of brainstorming, voting, and rating activities were tabulated using Microsoft Excel. Student art was immediately catalogued and preserved for analysis. Transcripts, tabulated results, and student art were analyzed using line-by-line coding, focused coding and thematic coding to identify commonalities, differences, and emerging themes between the various data sets and workshop results (Charmaz, 2006; Cohen, Manion & Morrison, 2000). As

4 This program does not automatically transcribe audio files, rather it allows the researcher to label different participants and catalogue their comments in a structured manner and to create time references.
temporal and geographic limitations prevented me from reviewing my coded interpretations of the data with the research participants, I asked a BC certified teacher who is an expert in EE to verify my interpretations and codes.

Determinations regarding whether the programs fostered ecoliteracy (Capra, 1999) and ecological citizenship (Clark & Stevenson, 2003; Dobson, 1998; MacPherson, 2005; Melo-Escrihuela, 2008) were made using the definitions I have defined in previous sections. Utilizing the principles of Grounded Theory (Charmaz, 2006), Upon completing my analysis I explored relevant literature in order to ground my findings in current academic debate.

A Note about Reliability and Validity

McTaggart (1998) suggests that the dominant discourse around validity in social science qualitative research centers around two main points. Firstly, “the quest for generalization” and secondly, “the quest for causality” (p. 211). McTaggart (1998) argues that participatory action research adheres to the principles of research validity but also interprets these principles from a different viewpoint. Rather than focusing on “defensible general causal inferences…replicability, prediction and control” participatory action researchers develop an understanding of situations by way of “an understanding of a particular concrete practice…a view of causality associated with individual intentionality, agency and subjectivity…and an awareness that intentionality, agency, and subjectivity are historically located and produced and reproduced by particular social, linguistic, material, political and cultural conditions” (McTaggart, 1998, p. 213). McTaggart (1998) also points out that the embedded nature of action research has also
lead to a tendency for researchers to view action research “as something that
‘practitioners’ do while professional, academic researchers do ‘real research’ (p.213).”

Cohen, Manion and Morrison (2000) comment that action research includes
reflection and an ongoing cyclical process of in-situ analysis. These activities provide
opportunities to explore biases, understandings, and observations through a critical lens
(Cohen, Manion & Morrison, 2000).

I approached this research from a social constructionist and socially critical
perspective. In doing so, I inherently projected my individual biases on the research i.e. I
feel that students’ voices are underrepresented in society, and thus I have developed a
research project to alter the status quo (Cohen, Manion & Morrison, 2000).

Bias: The Challenging Obstacle and the Limits of this Research

I have discussed my individual biases previously, however it is also important to
recognize the potential for bias results in this study due to the nature of the evaluation
model and the selection process for participating classes and teachers. The teachers were
recruited for this research with great influence from the respective program directors of
the Ecorowing and Seaquaria programs. These teachers have been described as “program
champions” by others involved in the programs. This was acceptable because this was a
pilot project of the evaluation model. However, I acknowledge that such parameters
create limits to the generalizations and inferences that can be drawn from this research.
FINDINGS

Ecorowing: The Power of Experiences in Nature

Learning in Nature: The Students’ Perspective

Preamble

Walking into a class of sixth graders is fantastically exciting. I feel that they are at an age where anything is possible. As a researcher your time with them can be chaotic, brilliant or a combination of both. It was a true honor working with this Ecorowing class and I am deeply thankful for their willingness to share their stories. I have attempted to pass on their stories by preserving as much of their voices as possible; their names however have all been changed to protect their identities.

Creating Common Expectations

When I posed the question “when somebody is coming into your class and wanting to work with all of you what kinds of things do you expect from that person?” the students initially looked stunned and taken aback. However, soon the responses began flowing including: “knowledge...like information” which was followed by “respect and kindness.” I asked the students to explain to me what would make them feel respected and treated kindly by somebody, to which a student responded “umm...like if we could each share our own ideas.” The students also felt that it was important for that person to be organized and polite.
Once we had explored their suggestions about what they expected of somebody I asked them what I might expect of them, their responses were very quick and seemed to roll off their tongues. It was as though they had answered this question many times before. “To be quiet”, “to listen”, “to put your hands up when you have something to say” were quickly rattled off. However, the students also suggested that “being open-minded”, “being involved”, and participating was also important. To me, this illustrated that the students understood that this was an interactive process and that their full participation was paramount to its success.

With a common set of guidelines to govern the workshop in place, I confirmed the willingness of the students to participate. After receiving a positive response we were ready to embark on our journey of discovery.

*Hands-on, Minds-on: Observing in Nature*

“I also think that getting out there is really important because a text book is not going to tell you everything, you actually have to do it to know what it’s really like and get out there and actually be close to those things that you are learning about. Because sitting in a classroom, it’s almost like staring at a cement wall for a day, it’s like staring at a cement wall” (Steve, grade six, Ecorowing program participant).

The importance of being in nature and authentically experiencing the lagoon was strongly voiced by the students e.g. as the student stated above, sometimes “you actually have to do it to know what it’s really like and get out there and actually be close to those
things that you are learning about.” The opportunity to observe animals in nature was extremely important for the students. While some students simply noted that watching wildlife was important or fun, others said that it was observing how animals live that was most important. One student expressed that “it made me feel special that I get a chance to see how the birds live and eat fish.” Another described why the bird watching was important to her by sharing that “there were lots of different types of birds. I think my favorites were the mute swans because I enjoyed watching them interact with each other.”

During the second workshop, 27 students, their teacher and Ecorowing program director participated in the ‘Voting Activity.’ Of the 290 possible votes, 283 were recorded; seven, less than three percent, were lost due to unknown circumstances. Details of the results are featured in the table below.

<table>
<thead>
<tr>
<th>Topic/ Area of Importance</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Observing wildlife</td>
<td>35</td>
</tr>
<tr>
<td>Eating lunch in the fresh air</td>
<td>31</td>
</tr>
<tr>
<td>Tree hugging</td>
<td>27</td>
</tr>
<tr>
<td>Forest walk</td>
<td>21</td>
</tr>
<tr>
<td>Rowing</td>
<td>19</td>
</tr>
<tr>
<td>Making up stories</td>
<td>15</td>
</tr>
<tr>
<td>Drawing and making bracelets</td>
<td>14</td>
</tr>
<tr>
<td>Activity</td>
<td>Count</td>
</tr>
<tr>
<td>---------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Wildlife surprises</td>
<td>14</td>
</tr>
<tr>
<td>Bird watching</td>
<td>11</td>
</tr>
<tr>
<td>Marine testing, salinity, pH, Temperature</td>
<td>11</td>
</tr>
<tr>
<td>Eating <em>salicornia</em></td>
<td>10</td>
</tr>
<tr>
<td>Creek walk</td>
<td>10</td>
</tr>
<tr>
<td>Looked in aquarium</td>
<td>6</td>
</tr>
<tr>
<td>Beach walk</td>
<td>5</td>
</tr>
<tr>
<td>Plankton research/ microscope work</td>
<td>5</td>
</tr>
<tr>
<td>Animal tracks</td>
<td>5</td>
</tr>
<tr>
<td>Games</td>
<td>4</td>
</tr>
<tr>
<td>Animal scat investigation</td>
<td>4</td>
</tr>
<tr>
<td>Explored sand dollar beds</td>
<td>4</td>
</tr>
<tr>
<td>Name tags</td>
<td>4</td>
</tr>
<tr>
<td>Investigated life in the estuary</td>
<td>4</td>
</tr>
<tr>
<td>Ecorowing booklets</td>
<td>3</td>
</tr>
<tr>
<td>Water walk</td>
<td>3</td>
</tr>
<tr>
<td>Poster projects</td>
<td>3</td>
</tr>
<tr>
<td>Stewardship</td>
<td>3</td>
</tr>
<tr>
<td>Insect observation</td>
<td>3</td>
</tr>
<tr>
<td>Learning about First Nations culture and language</td>
<td>3</td>
</tr>
<tr>
<td>Salmon release</td>
<td>3</td>
</tr>
<tr>
<td>Learning about the watershed</td>
<td>1</td>
</tr>
<tr>
<td>Favorite memory letter</td>
<td>1</td>
</tr>
</tbody>
</table>
Note. (n = 29) There were a total of 290 eligible votes; 7 were lost due to unknown circumstances.

By far, the most important activity for the group was ‘Observing Wildlife’ which received 35 votes. However, this value fails to tell the entire story, as 14 of the 32 activities/key learning experiences that the workshop participants defined, involved observing living things within the lagoon and the surrounding environment. If one totals all the votes that these activities received, then over 130 votes were cast for observation related activities. Among others, these included: the ‘Forest Walk’ with 21 votes, ‘Wildlife Surprises’ with 14 votes, ‘Bird Watching’ with 11 votes, and ‘Exploring Sand Dollar Beds’ with four votes. However, none of these results are mutually exclusive as students classified their experiences differently e.g. the following conversation during the first workshop about how to appropriately categorize an experience with mute swans:

Robin: “when me and Peter got to go…we got so close to Mute Swan eggs that we got to examine them.”

Peter: “all the swans were outside around the nest and they let us get so close that we got to examine their nest, we actually got like two meters away.”

Researcher (myself): “wow, so how should we describe that?”

Robin: “wildlife observing”

This experience could also have been understood as being ‘Bird Watching.’

While ‘Wildlife Observing’ and ‘Bird Watching’ were more structured activities, specifically focused on observing creatures, it is also important to note that observing living things took place during other activities too. Jenny described that the reason the beach walk was fun for her, was because she “liked seeing all the jellyfish.” Another
student wrote that he “liked the forest walk because we got to see all of the wildlife and the nurse logs.” During the forest walk his classmate learned that “when trees die other plants can grown on them.”

Perhaps the most surprising voting result was ‘Eating Lunch in the Fresh Air.’ With 31 votes, it received the second highest number. As the group and I reviewed the results of the voting together, I probed deeper into this outcome. I asked why people felt that this was so important. One student responded that he felt that it was “because while we were eating lunch we got to see all the birds swimming around in the water.” While this may not have been the reason why all of the students voted for the activity, it does illustrate how students can be continuously engaged by a natural environment and that outcomes of activities are sometimes unknown.

The importance of providing opportunities for students to observe and learn in nature is underscored by comments such as this one, by a young female Ecorowing participant: “I also liked how we just went out and learned about nature…it’s just kinda harder to learn about nature sitting in a classroom, like studying about it and it’s better to go out and learn about it through actual experience.” Her classmate explained that he “really liked the rowing because I got to touch sand dollars and learn about [the] estuary up close...[and]...we got to catch plankton, then observe them.”

Learning to Care

“At Ecorowing I learned about nature and how to respect it” (Stephanie, grade six, Ecorowing participant).
Steve, described arriving at the lagoon and thinking “it’s cold, dirty, wet and rough” and that “I didn’t know what an estuary was.” However, after the program Steve felt that he now “[knows] how an estuary is managed and how animals live.” A female classmate arrived at the lagoon with similar thoughts, although she also associated the beach with swimming. Upon leaving, she confided that she now knew how to “take care of the estuary.” Estuaries are complex environments and thus the students expressed the importance of having the chance to explore many of their attributes, including the inflowing creeks. One student described walking the entire length of a creek until it reached the estuary and commented, “we went all the way from the top of the stream to the bottom and learned about how the trees help clean the water.” The importance of such creek side hands-on learning was reflected upon by many of the students. Another student explained that he had the opportunity to take the “temperature of the stream, measure its width and depth and checked the pH.” The students identified this as part of being a “Stream Keeper,” and suggested that visiting the creek helped them learn “how to look after the stream and what is good and bad for it.” Other students summed up ‘Stream Keeping’ as being part of stewardship.

Several students identified strongly with the notion of being a “Stream Keeper,” including one student who wrote, “I really liked being a Stream Keeper” and noted that this was one of the most important activities for him. The interaction with the stream and associated activities resulted in several students concluding: “streams can be tested to learn what’s going on upstream.” One student expressed his thoughts with art, and drew a powerful image in his ‘Post-Program Cartoon Activity.’ Under the heading “observing health” the image featured a stream and bottles of chemicals crossed out.
I feel that this is an important theme, as it illustrates that not only do the students understand the complex systems and relationships that exist in a natural environment e.g. the role of trees in cleaning the water, but it also illustrates that some of the students had developed a basic understanding of how ecosystems can be kept healthy and how to monitor their health, a process one student described as “water care.”

During the open discussion period at the end of the last workshop, a student explained:

\textit{like before this, I thought our ocean was pretty good, pretty clean, but then we started learning about it more and going to [Ecorowing] and when we were learning about it, it just taught us more about how we need to keep it clean so that the animals can live there, because it’s an estuary and it’s protected and so what should we should be doing to help it.}

Jennifer summed this up best by saying simply at Ecorowing “I learned how to care for nature.”

\textit{Learning with the Heart}

\textit{“Ted the tree was so cool that everyone hugged him”} (Mark, grade six, Ecorowing participant).

As the students walked up to the front of the classroom and began to distribute their red dots across the list of their activities; one activity made everyone smile, and soon many red dots surrounded ‘Tree Hugging’. In the end, 27 votes were cast for this activity, making it the third most popular activity. During one of the written brainstorming activities, a male student proudly proclaimed, “I am an official tree
hugger.” Another expressed that the “Grandmother trees were amazing.” Unfortunately, there was not enough time in the workshop to investigate this result further.

**Being at Peace and Comfortable in Nature**

“It’s fun to just enjoy nature. Being in a forest is very calming, it makes you feel at peace” (Melanie, grade six, Ecorowing participant).

Several students noted the peacefulness and calmness that they felt when they were in nature. In the ‘Pre-/Post-Program Cartoon Activity’ one student wrote that the physical environment was very uncomfortable when he first arrived. After the program, he wrote that it was “calm, quiet, and peaceful.” Many students wrote that they felt that the rowing activity or the forest walk were important, simply because during these activities they were given the opportunity to enjoy the beauty of the scenery.

The students were given the opportunity to reflect and sit in silence during the ‘Drawing and Making Bracelets Activity’ and this activity received 14 votes. Whether having a programmed reflection period contributed to the way students felt about this activity, or whether it was the other attributes of this activity, is unknown.

What is interesting is that 22 of the 26 students drew or wrote about being cold or uncomfortable with the physical environment when they first arrived. In fact, for some students this aspect overwhelmed all other thoughts or sensations. However, not a single student expressed this in the ‘Post-program Cartoon Activity.’ While during the open discussion period one student did express that she would like to change: “the weather, because it kept changing, every time it was sunny, every time you’d take off your jacket, it would get really cold.” The class discussed that even in the face of such adversity, they
learned something. A male student shared: “what I think the weather does to the animals is that it makes the culture more diverse because it’s changing all the time.” Another shared his observations from their visits to the Lagoon, and noted that “on windy days [the birds] all disappear and when it’s all sunny and stuff like that they come back.”

The Joy of Exploring the Unknown and Being Surprised

“What will the forest be like inside?” (Lucas, Grade six, Ecorowing participant).

Many of the students wrote or drew about discovering new things during the Ecorowing program e.g. a female student describing her first experience with a jellyfish commented that: “I felt scared to touch it but it really did feel jellish! [sic].” The ability of nature to provide a dynamic classroom is tremendously important, as it allows for surprises and individual discovery. The importance of being able to encounter the unexpected is emphasized by one student’s comment “the animal tracks were so cool, I didn’t think we would get to see things like that.” Another student described how her group “saw [an] otter swimming through the water” and that it made them feel “excited and surprised.”

There are also less tangible outcomes (that are created) when students feel that they are encountering something different. Cynthia described watching an eagle soaring above and discovering a dead crab on the beach below; a female classmate of hers indicated that such experiences helped them learn about lifecycles. As one student noted “it made me feel special that I get a chance to see how the birds live and eat fish.” Another wrote that his group’s encounter with a deer and: “getting so close to it without it running away felt magical.” A classmate described that for her one of the greatest
outcomes of the Ecorowing program was that, “I learned wildlife always surprises.” Surprise wildlife encounters were very important to the class. During the voting activity, ‘Wildlife Surprises’ received 14 votes, the seventh highest number of votes, and ahead of ‘Bird Watching’. Perhaps most inspiring was Julia’s story; in her ‘post-activity cartoon’ drawing she wrote that after completing the program, “I now love to explore!”

Rowing to Learn

“Rowing was fun because most people in our class hadn’t experienced it before. We got stuck on the sandbar and that also made it fun because we all had to work together so we could get out” (Mark, Ecorowing program participant).

True to the Ecorowing name, there is a “rowing” component that also plays a significant role. In her ‘Stories and Thoughts Activity’, Margaret wrote why the rowing was important to her: “rowing was my favorite part of the whole field trip stuff. I enjoyed that it was hands-on and educational and fun. I loved being out on the water. We did need more time for rowing.” The idea that rowing was not only fun, but that it was also important for the class to learn something new together, was shared by many of the students. Lindsay, explained that for her the “rowing was fun because not a lot of people have ever been rowing including me so we got to learn it together- so like teamwork…” As Mark shared above, sometimes the rowing activity results in a group of students facing adversity e.g. getting stuck on a sandbar, but rather than this being a negative experience, it “was fun” because “we all had to work together so we could get out.” Ben, shared that for him “the coolest thing I learned was the rowing, overall it was the funnest
[sic] thing I have done there. It was full of teamwork and it was full of interesting experiences.”

The students felt strongly about the rowing activity and awarded it 19 votes, the fifth highest total. During the voting activity debrief discussion, I asked the class if they could explain to me why ‘Rowing’ received so many votes. Aside from the aforementioned comments about the rowing, the students also expressed that it was because rowing gave them the opportunity to get very close to the sand dollar beds. Mark suggested that it might have received so many votes because the class was not able to row during their first visit to the lagoon due to rough seas. Lucy, shared that she voted for the rowing activity because the class “got to paddle up close to one of the places with bird eggs, they had a lot of eggs in that one area and when we got stuck [on the sand bar] they actually all came over.”

Rowing might also not be for everyone; one student commented simply that “rowing is boring.” However, other comments from that same student indicated that he learned a lot from the stream keeping activities. Perhaps, this illustrates one of the strengths of the program, in that there is such a diverse array of activities that everyone has a chance to do something that intrigues and appeals to them.

The Importance of Creativity, Fun and Connecting to the History of a Place

“The forest walk was so peaceful and fun because everyone was all together and we made up really fun stories along the way” (Oliver, grade six, Ecorowing participant).
While many may view the *Ecorowing* program as a marine science program, it is very important to note that the students expressed a strong affection for the creative outlets provided during the program. ‘Making Up Stories’ and ‘Drawing and Making Bracelets’ each received 15 and 14 votes respectively, thus placing these two activities in the top seven (of the ones that the students felt were most important). Additionally, many of the students referenced these activities during the workshop exercises. I find this a very intriguing result as technical activities such as the ‘Marine Testing’ (salinity, pH, temperature measurement) and ‘Plankton Research/ Microscope Analysis’ each only received eleven and five votes respectively, thus placing them well below the more creative activities.

The stories students referred to were from an activity done as they walked together and explored the forest. Many of the students shared that this was a lot of fun. Mark shared that, “*the forest walk was fun because we made up stories and ate some huckleberries.*” The students’ comments indicate that having fun and having the opportunity to express themselves creatively are valued parts of the *Ecorowing* program.

From my discussions with the program educators I understood that the intention of the bracelet activity was not only to foster a creative connection with the natural environment, but also to raise awareness about human consumption of natural resources. While not all aspects of this message were echoed by the students during the workshop, the students did share comments such as “*I learned you can make bracelets out of nature*” and “*I really enjoyed making bracelets. It was a great hands-on activity about First Nations’ traditions.*” Another recalled “*we went on a walk and we made bracelets*
and nametags. Just like First Nations. The nametag represented your personality. And the bracelets represented mood.”

**Building Blocks of Ecological Literacy**

“[now I] know more about wildlife so I feel more welcome” (Lucas, Ecorowing participant).

Throughout both of the student workshops there were countless reflections, observations, and conclusions that are important building blocks for developing Ecoliteracy. Thoughts such as:

- “I learned how to tell birds apart”
- “I learned saltwort is edible”
- “knowing an animal’s close”
- “[Learning] why skunk cabbage smells”
- “I really liked looking at the aquarium because I loved looking at the marine life up close and seeing how they got along with each other”
- “[I learned about] identifying animal tracks”
- “general directions”
- “that the lagoon had plants and animals in it”

Or simply that “swans do not like otters.” Individually, these comments do not necessarily indicate that the student has become ecologically literate. However, they indicate that students are learning about their environment and in conjunction with the insights shared in previous sections they provide a stepping stone towards ecological literacy.
In his ‘post-activity cartoon drawing,’ Lucas wrote that because he now knows more about the wildlife at the lagoon he feels “more welcome” there. Cathy shared that the program helped her get “to know my surroundings” and Chris wrote that now “I look for creatures that I’ve seen before and like to tell my sister about them.” These reflections are all critical as they indicate that the program may help facilitate future environmental learning. In Lucas’ case, he may visit the area more frequently now that he feels more comfortable and hopefully he will continue to learn about the environment there. The program has helped connect Cathy to her own backyard. The program seems to not only have benefited Chris, but also his sister as she has now become a student of Chris.

What Would You Change?

“I wish we had more time to reflect and stand in one place” (Sarah, grade six, Ecorowing participant).

One of the last activities I asked the students to do was to think back to their brainstorming session about evaluating their ‘super bike.’ In the presence of the Ecorowing program director, Elizabeth, the students shared their constructive feedback about how they thought the program could be improved. Very respectively the students shared their thoughts including:

• “I think we should have spent more time looking at how other water sources got into the estuary”
• “I wish we had more time to reflect and stand in one place”
• “[I think the rowing should have been longer] because it was a lot of fun, just like to talk with your friend beside you and row and look around.

Some of the students also shared their feedback during the creative writing and art activities. Jenny expressed that she wanted to “learn more about how to help the living things thrive there.” Graham wrote that he wanted to “learn more about First Nations traditions.” Other students voiced their desire to have “as many hands on activities as possible.” However, one line from a student seemed to capture the youthful spirit of a young student best, she simply wrote “time to just explore.”

In an age where the lives of children could be viewed as hyper-structured, where there seems to be less and less time to just go out and play, the request to “just explore” is a sobering reminder of how sometimes even though we may feel we know what is best for children, we have to remember that the passion for unstructured, unhindered exploration is a basic human joy.


Sharing Learning: The Educators’ Perspective of the Ecorowing Program

Preserving Diversity

The Ecorowing educators’ focus group took place on a hot June afternoon. Many classes had spent the day on field trips and visiting local waterslides. As the seven participants began to trickle into the cool, naturally lit art room of a local school it suddenly became clear to me that this workshop would be much smaller than anticipated. The workshop I had planned would be inappropriate for a group this small, so I quickly adopted a focus group approach and abandoned the activities I had prepared. I gathered everyone around one table and began to ask open-ended questions in an attempt to distill the story of Ecorowing’s successes from an educator’s perspective.

During the Ecorowing educators’ focus group the first question I asked was what the participants felt the goals of the Ecorowing program were. The educators responded that the goals were to connect children with the local environment and watershed; that the program was a way to experience the lagoon in a very authentic way; that it was a way to feed the hearts, minds and spirits of the students; and that it was a way to connect the classroom with the real world. Furthermore, they felt that visiting the lagoon and participating in the program was a way to inspire wonder and awe about the beauty of nature. Not all of the goals were easy. The educators also expressed that it was important to challenge the students mentally and physically. They believed that overcoming the challenges created by the activities and the environment would foster personal growth, teambuilding and working with others. One educator even expressed that hopefully
Ecorowing would be a building block for transformational learning within the students. I gently asked whether it would be possible to capture all of these thoughts in a vision statement or in phrase. My intention was not to challenge the currently established vision of the Ecorowing program or its parent organization, SeaChange. Rather, I hoped to use a comparison between what this select group of educators defined as the vision and established vision as a platform for discussion. However, in response to my question, one of the participants, Elizabeth, a program educator, shared that she “didn’t want to” reduce all of the thoughts to a single phrase, as she felt that doing so would strip the program of its diversity. The other focus group participants shared this conclusion. Therefore, we revisited the goals and program attributes that the participants felt contributed to the success of Ecorowing. The main themes that emerged from these discussions included: connecting to the local environment, authentic experiences in nature, and personal and educational growth.

Connecting to the Local Environment

The importance of connecting the students with their local marine environment was a central theme during the educators’ focus group. One veteran marine educator observed that during a recent program with two local middle schools (that are situated in close proximity to the ocean) “we asked how many people had been to [a nearby beach] and about two percent of the students put up their hands. I was just floored.” The lack of connection with the local marine environment was also a source of concern for one of the teachers who shared that:

it’s amazing lots of the kids that live here don’t go to the beach, I was amazed when I took the grade sixes to [a local beach] and most of them didn’t know how
to build sandcastles in the sand, and I was like: okay you guys need a lesson in this because it is so much fun. First of all you can’t build it in the dry sand...

Paul, an Ecorowing focus group participant and program educator observed that this might be because of what Richard Louv describes as ‘Nature Deficit Disorder’ and suggested:

Ecorowing is one of those programs that can connect children to this world, and it's like you said, the kids that have never built sandcastles or because we have gone away from the structure and the things that we used to do as kids, and how we used to explore the world and now there is so much fear among us, or whatever it is that is preventing the kids from doing stuff, but it's a big, big problem. I think a lot of teachers have gone this way as well and it's also pretty hard to move beyond the four walls of the classroom because they are not familiar with those things either.

By providing positive interactions with nature, the Ecorowing program also helps students learn how to connect with nature in a respectful manner. They learn how delicate and full of life the lagoon is, and this changes the way students interact with the environment. Paul described the transition:

when the kids first arrive... you can see a couple of boys throwing rocks into the water. But often by the end of the day these kids understand about the beauty of the place and the fragility and so they have changed quite a bit in one day, and they’ve only been there for five to six hours, and even with that limited time, some of these kids change quite a bit ...like just last week there was a girl [who said] “I didn’t know a barnacle was an animal” she just had no idea and it’s right in their
backyard and all their lives they have been to the beach, they’ve been to the ocean and they have no real connection to the ocean, but in just a few hours...their eyes are opened, their ears and then their senses.

Authentic Experiences in Nature

“There’s something about being outside in a bigger world that is so freeing”

(Carrie, Ecorowing focus group participant and elementary teacher).

All of the educators highlighted the importance of the lagoon as an educational environment. Many referred to it as a special place, with exceptionally accessible biodiversity and a rich cultural history. The convergence of old-growth forests, creeks, and the ocean, create a dynamic learning environment. The participants shared that such an environment leads to powerful impromptu learning experiences that do not exist in the classroom. The recent discovery of a dead swan had triggered a long discussion between Ecorowing students about the appropriate resting place for the animal within the ecosystem.

Providing authentic learning experiences in a dynamic environment does not just make learning more relevant, it can also inspire students to learn. Paul shared a story of one student’s transition from being a bored, apathetic student who just wanted to go home, to becoming keenly interested in nudibranchs.

Last week there was this kid, and he saw a nudibranch floating [beside the dock] and he was like “what’s that?” and this kid, he really couldn’t care less, he just wanted to go home and so I said “I don’t know, let’s look.” So I took a net and we caught it and I said “wow, I think this is a new species and I think you’ve
discovered a new species” and he was like “wow, I discovered a new species” and then he was like “can I carry it?...can I put it in the aquarium?” and it’s moments like that that make this program right on.

Elizabeth, shared that being in a dragon boat on the water with the students allowed her to show them how the estuary worked from differing vantage points. She shared how valuable it was to be on the water and paddle past the mouth of the creek. It made it possible for her as an educator to help students connect their current experience with prior classroom learning activities and thus enrich their understanding. She explained:

I love that, because I can refer back to a prior learning opportunity [a class visit with a watershed model] and then we are in the water pointing to the creek, so the more that happens, the more you can make the connections, you can weave in the watershed understanding. This isn’t just about the lagoon, it’s actually the receptacle for the whole watershed.

While Elizabeth appreciated that the dragon boat made it possible to be on the water, Penelope, a middle school teacher, shared that the rowing activity provided the opportunity to have a captive audience. She felt that during the rowing activity:

it's kind of neat because there's activity and they are captive with the information integrated, and it's really quite effective, because they are working together and then all of a sudden they stop and listen because it's all so relative. It's right where they are looking. I got kind of a kick out of it because they always make me think of driving down the road with my own kids, you could always cover stuff when you were in a vehicle because they couldn't get away on you, even during
the most profound conversations. So the dragon boat is similar, because where can they go?

While the intention of the rowing component is clearly not to keep the students physically captive, it does provide an extremely relevant “classroom” for discussing bird life, discovering how sand dollars breathe, and learning about what makes an estuary function. Such discussions are also very authentic, as they occur while the dragon boat is gliding overtop of sand dollar beds, or while they pass a group of nesting sea birds. The students are totally immersed in the environment they are learning about.

Many of the students expressed how much fun they had during the rowing activity. Such fun also helps contribute to what one educator focus group participant dubbed a “positive experience” as she suggested “we all tend to [be] inundated by negative experiences so they are out having a positive experience that also gives them that connection [with the natural world].”

Personal and Educational Growth

While the Ecorowing program focuses strongly on helping students connect with the natural environment around the Esquimalt Lagoon, there are also variables of the program that impact other aspects of their personal and educational lives.

Carrie, a teacher with many years of involvement in the Ecorowing program, shared that one of the successes of the program was that “it’s integrated, it’s not just all about science. We’re reaching so many of the different learning styles and so many of the different strengths that children have, that there is lots of opportunity for them to be successful.”
During the *Ecorowing* program students are given the opportunity to spread themselves around the marsh area of the estuary and reflect on what they see while making a charcoal drawing. Thereafter, they are taught how to make bracelets with native plant species. A large part of this activity is to learn about First Nation culture and how people used to survive in that exact location from the resources provided by the natural environment. As Paul, one of the educators explained:

*There's also the First Nations aspect and it's not necessarily a part that you feel the kids would retain a lot about for example making the bracelets, but when I read some of these letters from the kids a lot of the kids chose an aspect of that, I think reconnecting to the First Nations and the First Nations’ vision of the natural world, I think the kids are quite intrigued, and I really try to put a lot emphasis on if I am doing the marsh part, and I think its really hard for them to imagine that two hundred years ago people could survive on what’s there, without a Thrifty Foods or a London Drugs. But they leave with a sense of wow... there were people who were so self sufficient and resilient that survived here.*

The goal of this activity is to help the students understand that the natural environment can provide for humanity. It also allows them to consider their consumption habits. Paul went on to describe:

*you know when we make the bracelets, it's such a symbolic, little thing to do, and these kids are so sophisticated and they have so much and they are into buying and consuming and then they make this bracelet and they are so happy to have this little thing and maybe for some of them it might give them a little bit of*
awareness of what we are doing in this world with the shopping and accumulating constantly...

I asked the group whether the Ecorowing program provided a solid foundation in environmentally responsible behavior. Carrie, one of the teachers with the most experience with the Ecorowing program shared:

*I think it’s a starting point, and I think it depends what you do after. I mean there certainly have been some amazing things that have grown out of this that have happened after- that have grown out of that first experience.*

While the concept of the program as a stepping stone towards positive environmental behavior is important, the teachers and educators also explained how Ecorowing provided opportunities to utilize skills developed during the program in other contexts. Trish, a program educator, and Elizabeth shared a story of how a class that had participated in the Ecorowing program, went on to participate in a beach program with the Seaquaria program, and chose to develop a research project that was based upon their observations during Ecorowing. Elizabeth explained that the students:

*wanted to know if the salicornia that was growing in the Esquimalt Lagoon would also grow at Moses Point and this was seven to eight months after they had done the Ecorowing program. So they had done the program and a lot of time had gone by in between...they are starting to make that connection.*

To which Trish added: “I think that’s really important because you realize that it’s not just a one off thing, it’s being held inside and it’s being used in other contexts. So it’s not just something that they are experiencing and forgetting about.” The reciprocal relationship between the Ecorowing and Seaquaria programs was also noticed by another
Ecorowing educator who pointed out that she had noticed “that the students that had gone through the Seaquaria program are much more respectful and careful with the animals. They know a whole lot more…and they are just very tender.” Another educator remarked how students that had been through the experience shared their stories with others: “this is so cool guys, it was the best thing, it was awesome” and commented how the students “want to be able to share that experience and they want to be able to share what they have learned with people… it was all about sharing.”

Mentoring Ecoliterate Teachers

During the educators’ focus group, there was extensive discussion about how the Ecorowing program could be a vehicle to help teachers gain comfort with taking their students out into nature themselves. One veteran teacher cautioned though, that while this was important, she still wanted to be able to visit the Ecorowing program to utilize the passion and experience of the program educators.

Paul also shared a depressing warning about encouraging teachers to take students outdoors if they had not had the benefit of proper mentoring or training. The educators all acknowledged that beach programs were hard to do, especially those “in soft substrate,” but Paul shared that during a recent beach visit he had observed an unassociated class unintentionally destroying a sand dollar bed “the kids were stepping all over place.” In a desperate voice Paul recalled: “I was thinking about all the sand dollars, and I was thinking maybe I need to do something, like put up a sign. It was a war zone, literally.”

The teachers and educators were unanimous in their support for mentoring, but cautioned that it takes time. Trish shared that “it’s not a process that just happens, like with [Susan] it took four years.” However, Paul also shared how the Ecorowing program
teaches the students to be really respectful and therefore, the *Ecorowing* program could be a stepping-stone towards educating both the teacher and the students about how to interact with the natural world in a non-destructive manner. Trish also commented on the fact that during the *Ecorowing* program the students are in a rowboat overtop of the sand dollar beds and thus the program provides a fantastic opportunity for observation without damaging the “soft substrate” and the sand dollars.

*If I Had It My Way: The Voices of the Teachers and Educators*

“I would have an out trip every month” (Carrie, *Ecorowing* focus group participant and middle school teacher).

During the educators’ focus group, I asked the participants to warp ahead five years and share what their dream *Ecorowing* program would look like. Carrie, responded that she would have “an out trip every month. I would have something every month that was connected.” Carrie felt that it was important to have an introductory trip in the fall, another in the middle of the year and one at the end of the school year: “I really like the idea that they are getting outside in three seasons.” She explained that it is important that students have an opportunity to “create action, so that it’s not just about the experience, but it also allows the kids to be important in that special place.” Others expressed that they wished that the program could reach even younger students. Some of the educators cautioned that this could be challenging as activities such as the rowing required a minimum physical size, but noted that “it could be something we work towards.”

Paul dreamed that the program would begin to look at the bigger picture and not just what is going on in “our little backyard.” He expressed that there were lots of new
innovative alternative technology programs that could be integrated. He also felt that the various EE programs around Victoria were too isolated and he was keen to see the various agencies work closely together to ensure “k-12 connectiveness [sic]” in EE programming and opportunities. Others echoed the concern of fragmentation among EE providers in Victoria, including Carrie, who noted that EE organizations “really need to start working together, the borders need to come down, the competition needs to stop. We need to become a cohesive group.”

The cut-backs to programming were lamented by all. Including one program director who noted that “once you become a successful organization it’s harder to get money.” While some felt that this was creating competition among EE providers, others simply said, “the pot is getting smaller.” Another participant pointed out that in light of all the recent funding cut-backs, the Ecorowing program was one of the few that went longer than a few hours and gave students the opportunity to be learning in nature for an entire day, and that this was too valuable to give up.

Citing program sustainability as a dream, Trish felt that it could be achieved if a focus was placed on “inspiring teachers to feel at ease to carry on, on their own.” She hoped that through a series of workshops, networking opportunities and mentorship programs teachers will feel like they can take their students out into nature by themselves. She described using the Ecorowing program “as a springboard, and get [the teachers] to a point where they feel comfortable to do it on their own with the kids.” This suggestion was met with some resistance by some of the teachers because they shared that they cherish the opportunity for students to be “exposed to people other than the
classroom teacher as experts” and they did not want to lose the experience of working with Ecorowing educators.

During a discussion about barriers to the success of the program, one of the teachers offered that teachers themselves might be part of the problem. Paul mentioned that presently, “the teachers are less engaged, there is less follow up, the kids are not prepared as well, as compared to the early days.” Other program educators felt that some of the teachers treated the Ecorowing day as a “day-off” for them and failed to create sufficient prior learning and follow-up learning opportunities for the students to enrich their experience.

The participants discussed how in the past teachers had been much more active at attending Ecorowing professional development days and sharing ideas and inspiring one another with lesson plans. The group agreed that the best way to catalyze such participation again would be to host workshops that featured experts, provided networking and idea sharing opportunities, and perhaps most importantly, allowed the participants to have fun.

Other barriers to program success included the stringent new reading and exercise guidelines that have been recently introduced to Victoria classrooms. Lisa, a middle school teacher shared that it was hard to keep the momentum of an outdoor learning experience going in the classroom:

because of the way things are timetabled. The other day at the staff meeting almost everybody voted to have time-tabled silent reading, and you’ve got to be kidding me, we now need a set time for silent reading. Everything is becoming
very regimented, you know what happened to: today we are going to do ‘this’ for most of the day.

Another teacher, Barb, brought up how such time-tabling was destructive to learning by sharing a hypothetical scenario “so what if we are in the middle of a science experiment and learning is happening right there, what are we going to do? Stop right now, okay it’s time to get your book out and read right now.” While all acknowledged that such parameters provide challenging teaching conditions and that the “educational structure itself was an obstacle for learning,” Carrie shared that she felt “people make time for what [they] think is important.” She also explained how she interprets the curriculum guidelines to allow her to explore EE concepts with her class. For example, she cited that the grade six curriculum focused on extreme environments. While others focus solely on arctic or desert environments, she also focuses on how humans are making the environment extreme. Carrie suggested that this gave her the opportunity to tie in many of the lessons and experiences of Ecorowing.

Other challenges that were addressed during the focus group included the potential lack of knowledge teachers have about how to evaluate their students’ participation in the Ecorowing program. Paul, shared how some teachers “take the Ecorowing booklet and tell the students, I’m going to grade the booklet and they almost create fear among the students, so I think there is that barrier in terms of how do I evaluate my students.” The group felt that providing increased opportunities for experienced teachers to share how they evaluate the program and how it addresses curriculum guidelines could help alleviate this issue.
Lastly, some of the participants brought up that Royal Roads University (RRU) itself is a barrier to continued program success. Citing a lack of financial and in-kind support from RRU, despite it being the future home of the Robert Bateman Art and Environmental Education Centre, educators expressed frustration at this disconnect. Currently, the organization tasked with raising funds for the construction of the Centre and for EE activities on the university campus, is located in the buildings directly adjacent to the lagoon. Participants failed to understand why this organization was not supporting the EE program that was actively taking place right in front of them.
Preamble

The Seaquaria student workshop proved to be challenging. A last minute scheduling conflict at the target school resulted in a different class participating in the workshop than originally intended. While the initial class had enthusiastically interacted with the Seaquaria throughout the school year, according to their teacher the re-assigned class was less enthusiastic and had done fewer learning activities based on the Seaquaria. Additionally, the teacher of the class told me that she had observed a strong degree of reluctance on behalf of the students to actively participate in activities throughout the school year.

Undeterred, I proceeded with the workshop, as I felt that even a less enthusiastic class would provide valuable feedback about the Seaquaria program and the evaluation program I had developed. Unfortunately, scheduling constraints at the school also required that the workshop series be shortened from three sessions to two. The first workshop lasted 50 minutes, while the second lasted 70 minutes.

In contrast to the Ecorowing student workshop, I was not able to visit with the class prior to the first workshop and thus a significant part of the first workshop was
spent introducing myself, the project, and laying the foundation for a successful partnership.

The teacher was surprised with the level of engagement the students showed during the workshops. However, I found it challenging to create an environment in which the students were actively engaged in the discussion and genuinely interested in sharing insights and experiences that were relevant to their Seaquaria experience. I departed from some of the intended activities and modified others to keep the workshop relevant to their interests and to ensure that some results were attained. While the direct information I was able to glean from the workshops is minimal, there are still significant findings. Not the least of which is the conclusion that this evaluation format may need to be refined to ensure that it is successful with a broader array of students and within complex school schedules.

Lastly, while the workshops may have been challenging from a researcher’s perspective, I am very grateful to the Seaquaria students for sharing their stories, for their joyful spirit and the exuberance with which they helped me understand their perspective.

*What We Expect when Someone Comes to Work with Us in Our Classroom*

“*hands-on stuff, so that we can do stuff*” (Mike, Grade six, Seaquaria participant).

As in the Ecorowing workshop, the Seaquaria students responded in a somewhat stunned manner to my question “*if somebody comes to work with you in your classroom what kinds of things do you expect from that person?*” It was as though this was an entirely new situation for them and potentially a question they had seldom faced;
especially in the context of a visitor coming to work with them in their classroom. However, after a few moments the ideas began to flow. One student quipped “free candy,” but after the laughter subsided, his classmates began to present very valid expectations. Mike shared that he expected there to be “hands on stuff, so that we can do stuff.” Several students voiced that it should “fun” and “interesting.”

When I asked how the students expect to be treated by a visitor to their class, one student responded that the person should be “fair.” Louise, her classmate, suggested that for her it was important to be treated with “respect.” Jacob declared that he just wanted that person to be nice. Perhaps the most interesting expectation was voiced by Melanie, she felt that it was important that the visitor simply “make sense.” While we used the expectations expressed above to help establish a set of governing principles, they also provided a source for immediate reflection for myself, “was the evaluation program hands-on ‘enough’? Was it fun? Was it interesting enough? And did it even make sense?”

Once we had established what the students expected of a collaborative partner, I asked what a visitor might expect from the students. Just as in the Ecorowing student workshop, these answers came easily to the students. Be “polite,” remember your “please and thank yous,” use “manners” and “greetings,” all soon began to roll off the tongues of the students. Paulo also shared that it was important for the class “to listen.” Lastly, several students suggested that being respectful towards to the visitor was also vital.

What was interesting about the guidelines that we collectively established and attempted to adhere to throughout the two Seaquaria student workshops, was that they also became evaluation tools. In response to a question during the voting activity debrief one student suggested that the reason an activity was valuable was that it was “was fun
and it pretty much met all those,” whereupon he pointed to the list of expectations that the students had developed.

So What Did You Do? Trying to Understand the Journey of a Class

Understanding how the class interacted with the Seaquaria proved to be one of the greatest challenges. From my scoping interviews and the Seaquaria Educators Workshop I was aware that every class interacts with a Seaquaria in a different manner, and that much of the variation is dependent upon the individual teachers and the classes themselves.

In order for me to begin to evaluate the success of the program, I felt it was vital for me to understand exactly what the class did. We spent the majority of the first workshop trying to reconstruct the past year of Seaquaria engagement. This was not an easy task. Because the workshops were held during the final weeks of school, several of the students were absent and it was difficult to find a way to focus the students’ attention. Some of the activities e.g. the ‘movie storyboard’ clearly failed to engage the students in the manner I had intended. However, through various brainstorming activities and adaptations of planned activities, I was slowly able to begin to understand how that class had interacted with the Seaquaria program.

In an attempt to visually illustrate the class’ journey of learning, we affixed the various ‘brainstorming activity’ worksheets to a river drawn on several sheets of newsprint. The results of the brainstorming provide valuable insight into this class’ experience. Most of the words, drawings, and phrases centred around five main themes: observing organisms in the Seaquaria tank, personally relating to the organisms in the
*Seaquaria*, animal husbandry and care of the *Seaquaria*, the ‘Live Lab’ event\(^5\) and the *Ecorowing* experience. References to observing organisms in the *Seaquaria* included statements such as:

- “*something is killing the organisms*”
- “*organisms dying because of the hermit crab*”
- “*that slugy [sic] stuff smelled really bad*”
- “*we found all the organisms in the water*”
- “*looking at organisms*”

Additionally, some of the students drew detailed illustrations of tubeworms, sea stars, sea cucumbers and sea lemons. The personal connection that students had established with the organisms within the *Seaquaria* was illustrated by the pet names that the class decided to give various organisms, and long-term observations such as the “*decorator crab has a temper.*” One student also drew a cartoon of a crab with a sword and evil eyes.

There were a significant number of references to animal husbandry and the care of the *Seaquaria*, including:

- “*Taking care of the organisms*”
- “*Cleaning the tank*”
- “*Cleaning the water in the tank*”

\(^5\) An activity during which *Seaquaria* educators and student mentors visited the class for an expanded lesson on the organisms in the *Seaquaria*. It involves extensive observation of the organisms in smaller “touch tanks.”
• “Keeping the tank a [sic] temperature”
• “Feeding the organisms”
• “How much food to give the organisms”
• “Respect the organisms”
• “Don’t poke the organisms”
• “Put new organisms in the tank”

References to the ‘Live Lab’ were minimal, but included phrases such as:
“[during the ‘Live Lab’ we] looked at real organisms up close.” It is interesting to note that the students blurred the line between the Seaquaria and Ecorowing programs. To them, both were vital components of their marine education. This level of integration may be seen as a positive in terms of integrated learning about the marine environment. It is worth noting, however, from an evaluation point of view because students asked about the Seaquaria program, for example, may actually be speaking about the Ecorowing aspect of their experience.

It is challenging to definitively attribute some phrases to either program, but for the purpose of this discussion I have included observations that have a strong likelihood of being linked to the Ecorowing program including:

• “Esquimalt Lagoon- looked at organisms, went boating”
• “humans have affected the creeks in a bad way”
• Numerous statements about: sand dollars, blue herons, seagulls, seaweed, lagoon, forest, plankton

I used the preceding brainstorm activity, in conjunction with the ‘Pre/ Post-Program Cartoon Activity,’ to initiate a discussion and brainstorm about what the class
did that year. I recorded the students’ conclusions on newsprint at the front of the class and facilitated the discussion. To create student ownership of the list and in an attempt to make the activity more fun, alternating students were chosen to be a fictitious radio “reporter,” complete with a foam microphone. The reporter read out the various conclusions and asked the class if there was more “news” that was needed to explain the topic. Where required, students expanded upon the topics and clarified points; this helped ensure that everyone clearly understood the parameters of each topic.

This activity provided some very interesting student comments. Mark shared that he felt “people might need to help organisms, because they are going pretty fast.” Samantha shared that the Seaquaria allowed her to learn about the “personalities of the organisms.” Phil expressed that the class “learned about what organisms do at low tide” during one of their field trips to the beach. A classmate shared how she learned that some “organisms don’t need food every day... some of them we only fed once a week.” Jake simply pointed out that the Seaquaria allowed him to discover “organisms that [I] didn’t even know existed.” One of the program educators shared how she had learned that the school’s Seaquaria housed two different types of worms, because of the observations the students had made.

In the end, the students, their teacher, and the two Seaquaria program educators identified 25 distinct activities or significant lessons learned. It should be noted that many of these are not mutually exclusive and that several topics involved extensive discussion and democratic decision making between the members of the class to determine where they best fit.
Voting for What Is Important to You

“[it is important] to know how [organisms] live or else you can’t protect them” (Cynthia, grade six, Seaquaria participant).

Following a brief discussion about voting, I distributed six coloured stick dots to each student, their teacher and the two program educators. An example of one of the voting sheets is displayed below (Figure 4).

Figure 4. One of the Seaquaria program voting sheets after the vote had taken place.
The participants were asked to distribute the stick dots on the topic or topics they felt were the most important to them, either because they valued them the most or because they learned the most through them. Similar, to all the other ‘Voting Activities,’ the participants were free to distribute the dots as they saw fit, meaning a student could have placed all six dots on one topic or distributed them according to another system. The results of the ‘Voting Activity’ are detailed in the table (Table 4) below.

Table 4

*Results of Seaquaria Student Workshop ‘Voting Activity’*

<table>
<thead>
<tr>
<th>Activity/ Significant Learning Topic</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Ecorowing</em> (Esquimalt Lagoon)</td>
<td>30</td>
</tr>
<tr>
<td>Observed the way organisms live</td>
<td>16</td>
</tr>
<tr>
<td>Observed Organisms</td>
<td>8</td>
</tr>
<tr>
<td>Learned about respecting the organisms (e.g. don't poke them)</td>
<td>7</td>
</tr>
<tr>
<td>Live Lab (seeing things up close)</td>
<td>7</td>
</tr>
<tr>
<td>Feeding organisms</td>
<td>6</td>
</tr>
<tr>
<td>Learned about habitats</td>
<td>6</td>
</tr>
<tr>
<td>Catching food for fish</td>
<td>6</td>
</tr>
</tbody>
</table>
Learned about new organisms (that we didn’t even know existed) 5

Learned to respect organisms in their habitats 4

Beach Trip 4

Cleaned Habitat 3

Saw the water up close (*Ecorowing*) 3

Learned about the personalities of the organisms (e.g. the crab has a temper) 1

Learned about relationships between organisms (e.g. hermit crab is causing things to die) 1

Maintained water temperature (pump/ chiller) 1

Putting organisms in the tank 1

Learned that we should help them 1

Organisms don’t need food everyday 1

Observed organisms in a bucket (including texture, size, etc) 1

Investigating why things die 0

Field Trip to the foyer 0
Learned about salinity (*Ecorowing*)

Exploring sand dollar beds (*Ecorowing*)

Connections—what happens when we don't feed things

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Note. A total of 19 participants voted using six dots each, two dots were lost due to unknown circumstances.

During the ‘Voting Activity’ debrief I asked the students to look at the results and share their observations. Several students noted the high number of votes that the ‘*Ecorowing*-Esquimalt Lagoon’ topic received. I queried this and asked the class why this might be. One student, Cameron, suggested that it might simply be because other students placed their dots there, indicating that the situation was the result of peer pressure. As a class we discussed this, and many of the students shared that they placed votes beside ‘*Ecorowing*-Esquimalt Lagoon’ because they legitimately felt that it was important and that the votes of others were inconsequential in their decision. Lee shared that she valued the *Ecorowing* program because “we got to like explore their habitats, and view the organisms...[and] you get to do that while you are doing other stuff.” Others expressed that they “learned a lot about organisms” during *Ecorowing* and therefore they voted for it. When I asked what they specifically learned about organisms during *Ecorowing*, Leslie explained that she learned “what they eat.” As mentioned previously, one student, Jake, used the guidelines we had developed for the workshops to help evaluate the *Ecorowing* experience. Jake explained that the reason he voted for the *Ecorowing* program was because “it was fun and pretty much met all” the guidelines.
This part of the workshop was very challenging, I had hoped for extensive feedback on why they had voted for certain activities. During the Ecorowing student workshop, the students were very eager to share their stories and justifications for their votes. I had expected the same result during the Seaquaria student workshop, but was surprised that the students did not elaborate on their votes. Had the process failed to “hook” or inspire the students to participate? During the first steps of the ‘Voting Activity’ debrief, I asked the students to use their observation skills and look at the results of the ‘Voting Activity’ (large sheets of paper, covered with lists of activities/important learning opportunities and groups of red stick dots beside various activities). I asked “what do you see, what sorts of trends do you notice, what do you observe?” Thus began a comedic tug-of-war between several students and me. One student responded that he saw “dots.” I asked what those dots were surrounding, and a student quipped that they were around “letters and symbols.” I asked what those letters symbolized and a student responded, “words,” to which I responded “I know you guys are really smart and have amazing observational skills, so what do those words mean?” Finally, another student responded with “Ecorowing.” While this tone was not indicative of the entire workshop, and was clearly a group of students choosing to have some fun and push boundaries, it also illustrates some of the challenges faced.

It should be noted that the class’ teacher was extremely helpful and interjected on two occasions with tactics that she had found successful with the class. For example, she split them up into partners and gave each pair 20 seconds to come up with thoughts or observations relevant to the current workshop activity. This type of impromptu
collaborative engagement was welcomed by myself, and constructive to the workshop outcome.

Understanding the reasoning behind the students’ high number of votes for ‘Observed the way organisms live’ and ‘Observed organisms’ was equally challenging. After the Ecorowing discussion I asked what other observations the students had. A student responded, “there is lots of dots by ‘Observe organisms’.” I asked the student why he felt this might be the case, he replied “I don’t know.” I put the question to the class, but received no response. When met with such impasses previously during the workshop, I had used a theatrical game, whereby each student placed their hands on the side of their heads and we pretended to “crank our brains and get ideas flowing.” I repeated this again with the class, and asked the students who voted for ‘Observe organisms’ to put up their hands. I asked this select group why they had voted for ‘Observe organisms.’ Stephanie mustered that for her it was just “important,” but she did not know why. Her classmate, Cynthia, provided a more detailed explanation, she felt that it was important to observe organisms “to know how they live or else you can’t protect them.”

The students then began to comment on the topics that received fewer votes. Paul was surprised that so few students voted for ‘Feeding organisms.’ Paul thought this was interesting because “you have to care for them,” because without food they will die. Paul’s classmate, Felix, suggested that if they had not put “the organisms in the tank then we wouldn’t really have to feed them.” This became an interesting brief discussion as it illustrated the sense of responsibility that the students felt towards the organisms and it
also showed that the students recognized the difference between a natural and artificial habitat.

‘Investigating why things die’ received no votes, yet the students had expressed the importance of this several times throughout the workshop. Therefore, we moved from the ‘Voting Activity’ and began an informal discussion about why this might have been the case. Melanie expressed that it was “probably because everyone felt bad that things were dying.” The class had named several of the organisms in the Seaquaria, including one that they had affectionately name “Sparky.” I asked whether naming the organisms had changed the way the students felt and related to the organisms. The students overwhelmingly responded “yes” and were suddenly much more enthusiastic to participate in the discussion. I asked the class why “Sparky” was important to them, Vanessa responded simply that Sparky “had personality.” During the workshop I learned that Sparky had died during the school year. I asked what Sparky’s death taught the class. Jake, expressed that Sparky’s passing helped him to understand that “no animals live forever.” Pressed for time, we were forced to wrap up the discussion and address my final question.

If You Could Change Anything about the Seaquaria Program...What Would it Be?

To ground our conversation about evaluation and change in practical terms, I had facilitated the same ‘Super Bicycle’ design process that I had used in the Ecorowing student workshop. During the final moments of the Seaquaria student workshop, we revisited the bicycle the students had designed and the thoughts they had shared about

6 The name has been changed to protect the identity of the students
how we might “test” it and how we might share our feedback with the engineers at the factory. I asked the students to apply the same thought process to the Seaquaria program and to provide detailed and constructive feedback. The students responded with an array of requests, many focused on wanting more organisms, or a larger tank with more organisms and fish. Some students expressed detailed requests for specific organisms such as “baby sea urchins, because they are cute” and “more sea anemones.” I encouraged the students to not only focus on the Seaquaria itself but also on the program. The students were asked to break away into partners and to interview one another about what they would like to change. Amelia shared that her partner would like “more organisms in the tank and see their personalities so that we could learn more about them.” Lindsay shared that her partner “wanted to have more trips to the beach too.” Jake’s partner would like “more trips to the Esquimalt Lagoon. Because it’s education and fun, and we should have more opportunities to be on the Marine Team, because it allows us to observe the organisms every day and see how they are living.”

I wrapped up the workshop by asking the students if they had anything else that they felt was important to share about any aspect of the Seaquaria program. Some elaborate stories about summer fishing adventures and recent Hollywood movies were told, indicating that the marine environment was a topic of interest, however, I did not feel that the comments were relevant to the Seaquaria program.
Seaquaria Collaborative Workshop: Perspectives from Educators, Teachers, and Mature Students

Defining a Vision

“To me ideally, the [Seaquaria program] is not environmental education but it’s a way of doing education, so somehow getting away from those silos and looking at it as a vehicle of education...using the environment to provide an education in a holistic fashion” (Graham, Seaquaria program director).

On a sunny, early summer afternoon, 17 program educators, funders, teachers, principals, a school trustee and three high school students gathered for the Seaquaria Educators Workshop. It was a diverse group that represented elementary, middle and high school education and the attendance of the three students was a welcome surprise. One of the things that I had noticed during my scoping interviews with teachers, school administrators and the program educators was that the Seaquaria program was incredibly diverse, and it is utilized in a wide variety of ways by different teachers and schools. I was also unable to define a common vision or purpose for the Seaquaria program from the scoping interviews. Therefore, after initial introductions I lead the group through a brainstorming exercise to help define a collective vision for the Seaquaria program. The intention of this was not to challenge the vision that the organization had already established; rather, my purpose was three-fold. One, I hoped that by having different
participants vocalize their vision, the workshop participants could be exposed to the incredibly diverse program elements and gain an understanding of the complexity and richness of the program. Two, I hoped that it would be beneficial for the organization to see how their existing vision compared to the collective group vision. Third, the evaluation of the program depends on clarity of what the program intends to achieve.

Throughout the brainstorming activity, I recorded the participants’ comments on large sheets of paper. As the group began to share more ideas with one another, it sparked additional ideas among other workshop participants. After approximately 15 minutes, the group had defined 26 distinct words and phrases that the participants thought were key to the vision. The list included:

- Joint learning
- Education-specifically marine biology education
- Discover together
- Engagement
- Hands on experience
- Connections
- Direct interaction with the marine environment
- Sparking curiosity
- Breaking down barriers
- Stewardship
- Responsibility
- Connection
- Small but huge = global
- Students as teachers
- Expanding curriculum
- Alternative learning ways/processes
- Appreciation
- Holistic education
- Integrate curriculum
- Mentoring
- Empowerment
- Individual and collective appreciation of one’s skills
• Student centred
• Means to an end
• Vehicle for education
When the group felt that they had exhausted their list, I asked them to begin to define a collective vision. I explained that it did not have to be a vision that was permanently adopted by the organization; rather it simply had to be one that the group could agree upon for the duration of the workshop. One participant expressed “to me, it's the last one, the ‘vehicle for education’ that sort of captures all the others...” Heads began to nod around the room. I asked the group how they felt about this conclusion. The entire group responded positively. I was somewhat surprised that this happened so quickly, but also viewed it as confirmation that such an approach can successfully bring a group together to form a common vision. Collectively, the group had decided that “the Seaquaria program was a vehicle for education.”

*Charting the Journey to Understand the Destination*

A two-hour workshop can pass very quickly, and it was clear to me that teachers, educators, principals, school trustees and students are all very busy people. Having everyone together was a privilege and an experience that required a judicious use of time. Additionally, as the visioning process had demonstrated, everyone engaged with the program in a different manner. Thus I structured the workshop so that it would allow maximum information exchange among the participants while at the same time utilizing a methodology that would allow the group to cast a broad net to capture ideas and then focus in on what they felt was most important. To do this I used the same methodology as with the two youth specific workshops- we ‘took stock’ of the program and then voted. I lead the group through a brainstorming exercise to identify what significant activities and learning opportunities are associated with the program? What outcomes the group has
observed? Also, to explore program attributes that the workshop participants felt were important.

The group identified 25 distinct thematic niches and areas of importance that it associated with the Seaquaria program. Once a list had been established, I distributed five coloured stick dots to each participant. The participants were given the same instructions as all of the student workshop participants: to distribute the five dots among the topics that meant the most to them or the ones that they felt were the most important for the Seaquaria program. As the workshop was at a very busy time in the school year, some participants had to leave early, while others were late arriving. During the voting, 18 participants were present. A total of 88 votes were cast, two were lost due to unknown circumstances. The 25 areas of importance and their corresponding vote total are presented in the table (Table 5) below.

Table 5

Results of Seaquaria Educators’ Workshop ‘Voting Activity’

<table>
<thead>
<tr>
<th>Topic/ Area of Importance</th>
<th>Number of Votes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning about your place through positive experiences</td>
<td>15</td>
</tr>
<tr>
<td>Observations- Hands on learning</td>
<td>12</td>
</tr>
<tr>
<td>Inspires higher order thinking/ creation of hypothesizes</td>
<td>7</td>
</tr>
<tr>
<td>Commitment to sharing learning: mentoring, life long learning etc.</td>
<td>6</td>
</tr>
<tr>
<td>Hooks vulnerable kids</td>
<td>6</td>
</tr>
<tr>
<td>Benefit</td>
<td>Score</td>
</tr>
<tr>
<td>------------------------------------------------------------------------</td>
<td>-------</td>
</tr>
<tr>
<td>Flexibility for curriculum use</td>
<td>5</td>
</tr>
<tr>
<td>Seaquaria becomes a special place in the school: focal point, provides tranquility, staging point</td>
<td>5</td>
</tr>
<tr>
<td>Fosters volunteerism/ employment</td>
<td>5</td>
</tr>
<tr>
<td>Program sustainability: program growth, influential, impact, builds/selects champions</td>
<td>4</td>
</tr>
<tr>
<td>Bridges in school with out of school</td>
<td>3</td>
</tr>
<tr>
<td>Career influence, awareness, exposure</td>
<td>3</td>
</tr>
<tr>
<td>Vehicle for communication</td>
<td>3</td>
</tr>
<tr>
<td>Breaking down barriers</td>
<td>3</td>
</tr>
<tr>
<td>Decompression Chamber</td>
<td>3</td>
</tr>
<tr>
<td>Provides focus</td>
<td>2</td>
</tr>
<tr>
<td>Platform for reaching students</td>
<td>2</td>
</tr>
<tr>
<td>Breaks down stereotypes: about disabilities and what education is</td>
<td>1</td>
</tr>
<tr>
<td>Organize cross-curricular projects</td>
<td>1</td>
</tr>
<tr>
<td>Social studies and cultural education</td>
<td>1</td>
</tr>
<tr>
<td>Inspires out of the box thinking through novelty and complexity</td>
<td>1</td>
</tr>
<tr>
<td>Fosters deeper understanding of relationships</td>
<td>0</td>
</tr>
<tr>
<td>Inspires life long commitment</td>
<td>0</td>
</tr>
<tr>
<td>Provides employment: keeps people working</td>
<td>0</td>
</tr>
<tr>
<td>Example for special course, thematic niches</td>
<td>0</td>
</tr>
</tbody>
</table>
Upon completion of the voting, I tallied up the results and selected the top nine categories for further discussion. I asked each workshop participant to consider how well he or she felt the *Seaquaria* program was accomplishing each specific task. I asked that participants “score” this on a scale of 1-10; one represented “very poorly,” ten represented “excellently.” Once all the workshop participants had determined a score for each topic, I asked that they record their scores on a chart I had drawn. The nine topics and the individual scoring results became the basis for discussion. As I had expected participants scored individual topics differently, and the contrast of higher and lower numbers provided an immediate source of discussion. A table (Table 6) with average topic scores is presented below:

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7 I had intended to select the top 10 topics, but there were five topics that each had the same number of votes in 10th place. In an attempt to ensure that the topics remained manageable within the tight time parameters, I elected to only use the top nine.
### Table 6

**Results of Seaquaria Educators’ Workshop Topic Scoring**

<table>
<thead>
<tr>
<th>Topic/ Area of Importance</th>
<th>Number of Votes</th>
<th>Average Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Learning about your place through positive experiences</td>
<td>15</td>
<td>8.4</td>
</tr>
<tr>
<td>Observations- Hands on learning</td>
<td>12</td>
<td>8.1</td>
</tr>
<tr>
<td>Inspires higher order thinking/ creation of hypothesizes</td>
<td>7</td>
<td>7.9</td>
</tr>
<tr>
<td>Commitment to sharing learning: mentoring, life long learning etc.</td>
<td>6</td>
<td>6.5</td>
</tr>
<tr>
<td>Hooks vulnerable kids</td>
<td>6</td>
<td>7.8</td>
</tr>
<tr>
<td>Flexibility for curriculum use</td>
<td>5</td>
<td>7.8</td>
</tr>
<tr>
<td><em>Seaquaria</em> becomes a special place in the school: focal point, provides tranquility, staging point</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td>Fosters volunteerism/ employment</td>
<td>5</td>
<td>6.7</td>
</tr>
<tr>
<td>Program sustainability: program growth, influential, impact, builds/ selects champions</td>
<td>4</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Note. For topic scoring activity (n = 14). Scoring is on a 10-point scale. Topic scores are not intended to give a statistical evaluation, their intention is to provide a basis for comparison and discussion.
Learning About Your Place Through Positive Experiences

except for this program, it’s not really being taught anywhere else. I mean I’ve lived on the ocean my whole life…and I had no idea…I knew there was a red rock crab and…a Dungeness crab, but that’s it, that’s all I knew. But now I go [to the ocean] and I’m like, oh, that’s what it is and I can name it and I can show my parents…I mean they didn’t know it and neither did I (Stephanie, high school Seaquaria program student and educators’ workshop participant).

‘Connecting students to place’ received the highest number of votes and had the highest average score. Despite Victoria’s close proximity to the ocean, workshop participants expressed that connecting residents to the ocean remains a priority. Carrie, a program educator for the Seaquaria program, shared that she is often asked where the organisms in the tank come from. She explained that people are often surprised when she responds “right there” and points to the ocean only a few yards away. Shaking her head she proclaimed, “they have no idea.” Melanie, another program educator, shared that she often watches people observe creatures within the Seaquaria at a local marine education centre, but they fail to understand that they could do the same a few steps from the door.

There’s people that spend half an hour looking at stuff and they are like ‘that’s totally awesome and cool’ and then you say you can go down to the beach right now and you can see these five animals right now…and touch these things and spend as much time as you want down there and people
are like ‘what this stuff lives here? They look like crazy tropical creatures…’

I asked the group why they felt that the Seaquaria program fostered a positive connection to place. Nancy, a local middle school teacher, responded that it is “because it brings their backyard right to them, and they don’t know what is in their backyard so it’s immediate.” Carrie tied in the challenges that schools face with organizing field trips and expressed that the Seaquaria program connects people with place “because it is right in the schools rather than having to go through the hoops that have to be taken to go on a field trip to the beach.” One teacher had observed that in her school students had organically interacted with the Seaquaria and she felt that this was key to learning about place “it doesn’t require a teacher telling them to do it for them to enjoy it…it’s right there and [they] can initiate self involvement…it just happens.” A fellow teacher, Danielle shared that at her school the Seaquaria is located in the secondary area and that she often

[catches] teenagers just sitting there and staring at it, and I think the value of it is absolutely indescribable...it is a positive interaction with nature in a comfortable space...a space they are familiar with...and they are interacting with the natural world...it’s acquiring a sense of place, of natural place in a familiar environment.

For students like Stephanie, the Seaquaria program provided an opportunity to learn about her place and “that’s not really being taught anywhere else.” Despite growing up on the ocean, Stephanie credited the Seaquaria program for her development of basic
marine literacy. She shared that now she can identify and name organisms at the beach and “I can show my parents.”

_Making Observations and Inspiring Higher Order Thinking: The Lonely Goldfish vs. The Seaquaria_

“If you are watching a goldfish tank there’s not much going on in your mind really. If you are watching the Seaquaria there’s a lot going on”

(Linda, Seaquaria educators’ workshop participant and elementary school teacher).

In a sense the topics ‘Observations’ and ‘Inspiring higher order thinking’ are intrinsically linked, therefore I have chosen to present them together here. The workshop participants felt strongly about the observation opportunities that the Seaquaria program offers. In fact, with 12 votes, they voted it as the second most important topic. A more distant third place was ‘Inspiring higher order thinking’ with seven votes.

One of the key elements of the Seaquaria program that was expressed by the program educators was to use the program to encourage teachers to use the Seaquaria as a stepping-stone for trips outside. One of the students, Julia, shared that for her marine learning, trips to the ocean to have an opportunity to observe marine organism were essential. She said “you learn so much more just by spending a few hours [at the ocean] than you would by cramming for five hours at home...it’s having observations first hand it just helps so much more.” Her classmate, Stephanie emphasized the importance of being provided with hands-on classroom learning opportunities for marine observations and explained such observations are important because:
they are your own observations, as opposed to reading it in a text book and it saying “this person observed this” you are observing it so you can write down “this is what I saw.” instead of copying down notes that say “they have observed for the past ten years…” it’s much more hands on, it’s much more enjoyable.

While Stephanie and Julia explained how important having real life, hands-on observation opportunities were for structured curriculum learning, they also provided insight into the value of the Seaquaria as an unstructured learning experience. Julia shared:

I went to [a local middle school] and that tank is like, everybody sits there at lunch and everybody knows the creatures and you name the creatures that are in there...one time there was fish under the grate and everybody was so distressed and like “oh no!” It was so much fun...you are observing it and you don’t have to report back to your teacher and say ‘this is what the text book told me.

Julia’s comments about how she made observations for fun instead of because she was “being told to” caught the attention of Graham who reflected that this was “very interesting.” Julia responded that at her middle school “we were there [around the Seaquaria] every morning, we were there at lunch- even now when I go back to visit my teacher we will sit and chit chat in front of the [Seaquaria]” and I’ll notice “oh there’s the sea cucumber.”

Several teachers had observed similar informal learning opportunities, including Linda, an elementary teacher, who shared that in the “Seaquaria there’s so much
interdependency, that's the complexity and the surprising thing is that the kids always know what’s going on and what is dependent on everything else.” Melanie, pointed out that the Seaquaria “is a whole habitat, rather than a fake habitat like a goldfish tank.” The participants reflected on a past school board initiative to install goldfish tanks in several of the schools in the district. Some joked that such tanks were like “watching a fire… it’s for having kids relax.” However, it was also pointed out that such tanks were installed to be easy to maintain and that the Seaquaria tanks are far more complex. One participant, Paul, noted that the increased complexity in the Seaquaria made it a much more effective learning opportunity because there was “way more opportunity around engagement connection and all the learning aspects.” He also recalled his fears when the Seaquaria first arrived in his school:

_I mean I was just blown away when it started to be up and running and I thought “oh my gosh are we going to be able to keep this going?” and that was my fear factor because there was so much complexity in there it did require so much commitment._

Linda, pointed out that that very complexity is what makes the Seaquaria so valuable. She commented that in contrast to the goldfish tanks “there’s a lot going on” in your mind when you observe a Seaquaria. She also noted that the children are very knowledgeable about the relationships between organisms in the tank and “they can tell you exactly what’s going in there.” In Linda’s experience, it was often the most vulnerable students that: “will come and tell you ‘this animal was over here yesterday and he was behind this and now he’s over here and look what has happened’. They notice the relationships in there all the time, they can see them.” Graham questioned whether
the current status quo education system is “killing off” observation skills. As a trained biologist he suggested that while he might ignore some of the observations the students are making “they are novel observations.” To which Linda quickly responded “yeah and they are not fake, they are real life for those kids, they know that those animals live in their community, it’s all real.”

On the day of the Seaquaria educators’ workshop, tragedy had struck one of the local elementary schools. The workshop took place on a Monday afternoon, and over the previous weekend, the chiller had failed in the Seaquaria tank. Joan, the school’s principal, and a long-time Seaquaria user and advocate, shared the depressing story of discovering that all the organisms had died. Because of the incredible smell that was emanating from the tank, its contents were rapidly removed prior to the arrival of the students on Monday morning. Joan shared that the students at her school routinely walked past the Seaquaria and made observations “because we just want to, because it’s there.” Even on a day marred with tragedy, Joan observed that:

*the kids were just walking by and making all these hypotheses about what possibly could have happened to the aquarium. Like “where did the animals go?”... some believed that they “went back to the ocean of course, but how could possible go back because they were dead,” but the whole “why would they go back?” “because it’s an ecosystem and maybe that’s where they would be if they died anyway”.... It’s pretty high level hypothesizing for kids who are autistic and six!*
Inspiring Commitment to the Sharing of Knowledge

What I see are examples like [Stephanie and Julia] who come out to all sorts of not only community events but also go into [local middle school] and mentor for in school type programs, so this commitment to, it’s not just stewardship but also a commitment to sharing learning outside of the school walls” (Lindsay, Seaquaria program educator and workshop participant).

Although all the workshop participants agreed that the Seaquaria program was very student centred, they also shared that the focus is not solely on teaching students. Rather it is also on allowing students to become teachers and mentors to others. Graham described this as “inspiring a life-long commitment.” Linda shared a story about a young student in her school:

I have a boy with a pretty serious speech impediment and when we were presenting about the [Seaquaria] at a workshop downtown at the ‘Water Workshop’...he spent a couple of hours talking to anybody that walked by and wanted to talk about the touch tanks...that was pretty surprising because...he overcame his speech issues and talked to everybody.

While Linda’s story illustrates a short-term example of a student becoming a teacher, Lindsay’s story about Julia and Stephanie regularly mentoring younger students and members of the community, illustrates the “commitment to sharing learning outside of the school walls.” Lindsay and Graham shared a story of how their very first university co-op student ended up completing her biology degree, and subsequently enrolling in
teachers college and becoming a teacher “because she decided that’s what she wanted to do...and now she’s started a Seaquaria program in her school.”

Engaging Vulnerable Kids and Providing a Tranquil Place

“What do you think the sea cucumber would be doing right now if it felt like you feel?” (Question overheard in front of the Seaquaria by Joan, Seaquaria educator workshop participant and elementary school principal).

During the workshop, several educators told stories about how the Seaquaria hooked vulnerable students. Overall this topic received six votes. This topic is closely related with the notion that the Seaquaria provides a special place in a school. The participants also felt that the Seaquaria creates a tranquil place that can be used as a staging point to deal with behavioral issues or to prevent their escalation. It was also suggested that the Seaquaria had become the focal point of many schools. As mentioned previously, students are often keenly aware of detailed developments within the tanks. Especially as one teacher pointed out “the kids that really sit around it are the most vulnerable kids in the school...they know those animals, they are more successful when they are at the tank.”

Having the Seaquaria located in a central area was identified as being key to allowing wide spread access and providing students the opportunity to spend time there before school and during their lunch break. In many schools, the Seaquaria is located in the main foyer so that not only the students, but also parents and school visitors can benefit from it. Joan shared how in her school, many parents have had negative
associations with schooling in the past, to the point where some simply refuse to step on to school property. She explained that the desire of individual students to share the *Seaquaria* with their parents had persuaded some parents to enter a school again. Ensuring that the *Seaquaria* is in an accessible location is key to such success.

Stephanie and Julia lamented that the current location of their school’s *Seaquaria* means that “unless you are going to the principal’s office you don’t really see it.” However, Julia suggested that if

*it was somewhere out in the open where you pass by it every single day...twice a day then... you’d notice it and you’d take note of what you are seeing. But I find it’s out of the way so I don’t notice it very often.*

Joan further explained that in her school the *Seaquaria* has become “the outer office.” She noted that in her role as principal:

*Children ... are generally coming to me because they need calming down or they need help to solve a problem or something, and they stop when they get to the tank and by the time they get to me they have had time to decompress, process their own problem and I have very little to do with the solution and they are headed back.*

That sense of calming was also noticed by Paul who shared that when he first arranged for the *Seaquaria* to be built in his school he really hoped that it would not only be a central focal point for the school but that it would also act as a “*place of peace and tranquility.*” He observed that it “*was amazing, it would be a place where people sit around and do what ever it is they do.*”
Joan, shared an inspiring story whereby the anger shown by a vulnerable learner was mitigated and turned into a learning exercise by the presence of a Seaquaria and the actions of a quick thinking teacher. Recalling a recent event in her school during which a young student was very angry:

*I heard one of the adults who works with [the] student ask “what do you think that sea cucumber would be doing right now if it felt just like you feel?”...[thus] giving the child the opportunity to be in somebody else’s shoes for just a second. “So if your feelings were inside that sea cucumber what do you think you’d be seeing that sea cucumber do?” Which totally deescalated the child and made him curious [and ask] “I don’t know, what do you think?” Then they came into me to ask me questions because I’m now the “marine biologist” and I said “I don’t know, what could we do to find out?”.... So there’s all kinds of thinking and articulating and learning, because that child in fact went on the computer and tried to search for “angry sea cucumbers” and learned how to use a search engine and...research something and take the initiative to do research...this was a kid who the reason he was sent to me in the first place was because he didn’t want to take the initiative to do a science project and so here he was doing science.

Joan finished her story by questioning how the teaching community could create more of such learning opportunities for vulnerable learners. In Joan’s opinion, teachers could learn a lot from figuring out what it is about the Seaquaria that hooks those learners and bring those observations into the classroom. In Joan’s words:
we do a lot of work in this district with differentiated instruction and trying to reach those vulnerable learners...and I just think [the Seaquaria] has been a really key way for us to reach not only vulnerable learners but also others at our school and not just those with autism...

Flexibility for Curriculum Use

While only discussed minimally throughout the workshop, participants expressed that the wide range of curriculum opportunities that the Seaquaria presented was integral to the program’s success. One teacher enthusiastically shared that you can do lessons “in almost every area of the curriculum, there’s art, drama, social studies, science, personal responsibilities. So it’s very integrated and it can be integrated into the curriculum for any grade and into a whole variety of subject areas.” As an example Stephanie added that the previous day her class had participated in a canoe trip on the Gorge Waterway and learned about the Songhees Nation and the importance of the plants and marine life to their culture.

While the participants demonstrated that the Seaquaria could be easily integrated into the curriculum, they also identified clear barriers to doing so. Including the physical location of the Seaquaria. One teacher who travels throughout the Saanich school district observed that in the high school settings, the Seaquarias were often “tucked away in the back corners of biology labs so that only kids that are doing biology” have access to them.

Equally important were comments by teachers that curriculum restraints are making it more challenging to incorporate additional learning material. Pam, a high school teacher stated:
from my observation in high school you get lodged in your silo and you don’t get out of them. You are in your science silo or you are in your English silo and the notion around integration is very difficult because at the end you have that thing called an exam, and you gotta get from page 0 to 181 in that math course...

Julia also noted the time pressure placed on teachers and students during high school. She shared that during elementary and middle school there had been a lot more time for random observations of the Seaquaria. She recalled that in middle school “there was so much interest and you would always talk about [the Seaquaria] when you passed it but once you get to high school you are booked.” Stephanie added that “we don’t have enough time to just like take a few minutes and see it for ourselves, we just have to keep on studying, I wish that would different.”

Fostering Volunteer and Employment Opportunities

Perhaps the most successful dialogue between program educators, program developers, teachers and the high school students, took place once we viewed the results of scoring the ‘Fosters Volunteer-Employment Opportunities.’ As one of the students commented, “I think there is a definite difference between what the students thought was important and what the adults/teachers thought was important. I think the volunteer was definitely important for us.” Graham, later expressed that as an organization “we’ve always struggled with what to do with high schools” and offered that the dialogue surrounding the inspiring volunteer and employment opportunities had “created a new kind of window for” him. Perhaps, he suggested, if they looked at how the Seaquaria program can foster those opportunities, they could depart somewhat from feeling like
they have to create a special high school class around the Seaquaria. However, Linda shared that recently several new classes were being developed within the school district that focused on topics such as environmental studies and sustainability and these might also provide an attractive opportunity for Seaquaria engagement within high schools.

Central to these discussions had been stories shared by the students about how they had been asked to volunteer at ‘Oceans Day’ and how this volunteer engagement triggered others. Eventually, their volunteer experience helped lead to employment. One of the students explained how she “started volunteering a lot with Oceans Day and finally I got a job and I’ve had a job ever since, and looking back on it, it all kinda started there.” Other teachers relayed the important role that the Seaquaria played in exposing students to potential career options. In fact, because of her involvement with the Seaquaria program, one of the students at the workshop now wanted to become a marine biologist.

Sustainable Programs

One topic discussed at the workshop, illustrated that the program’s success is also tied to the sustainability of the program itself. Paul, a former teacher who was actively involved with bringing Seaquarias into schools, and is now a school trustee, expressed how in his experience the ability for a program to keep itself going within schools is an indicator of success. Noting that at his former school, the Seaquaria was introduced in 2002 and was still active in 2009, he felt that this represented program sustainability. Reflecting on what it takes to achieve this, Paul explained “it means that someone has made a commitment or that they have been successful in handing off that commitment and the responsibility to keep it going.”
Linda mentioned that while the program has grown from one school in 1999, to 30 in 2009, not a single school has abandoned the project. One school was forced to temporarily shut down their *Seaquaria* because they were moving schools, but she anticipated that they would be reassembling it in the near future. Furthermore, she echoed Paul’s comments when she shared her observations that in several schools the key teachers responsible for the *Seaquaria* had moved on, but they had always found a new champion to pass it off to. This created an interesting discussion among the participants, and no one could conclude whether the program built future champion teachers or it attracted existing champion teachers. Regardless, the group agreed that the role of creative and inspired teachers is critical to the program’s success.

*How Could We Improve The Program*

The final question that I asked the workshop participants was to look at the program component scores and to consider how we could make each score a perfect ten. I had anticipated that this would be the beginning of a dialogue about how to improve the evaluated program components. I had hoped that this would lead to the group discussing possible issues and resolutions. Furthermore, I had hoped that workshop participants would then take responsibility for implementing the proposed strategies and ideas.

In an unexpected twist, one of the participants pointed out that they did not believe that all the components needed to score a perfect ten, and that the fact that not everyone scored the program perfectly was a representation of the diversity of the program and its success. Numerous other participants agreed. Bowing to the participant driven nature of the workshop, I accepted this conclusion from the group. Two hours had flown by and I was now left with a mountain of information to process.
DISCUSSION

Preamble

As I begin to draw conclusions about the Ecorowing and Seaquaria programs it is important to reiterate that this research is a pilot project. It is not an exhaustive evaluation of all aspects of either program. The findings that follow are a starting point for further investigation of the Ecorowing and Seaquaria programs. They add to the growing body of research that concerns itself with bringing children’s voices into the evaluation of place-based EE.

Part A: The Ecorowing Program

The Relationship between Ecorowing, Ecoliteracy, and Ecological Citizenship

The results of this evaluation suggest that Ecorowing contributes to the ecoliteracy development of its program participants and provides a platform for fostering ecological citizenship. I remain unsure whether one experience can single handedly “teach” ecoliteracy, rather I feel that it is a series of experiences in one’s life that help contribute to developing ecoliteracy. As Capra (1999) states, the concept of ecoliteracy extends beyond just understanding basic ecological principles to include “embodying them” in our daily lives and communities (p.2). Based on my research it is clear that the Ecorowing program contributed to the students’ understanding of marine and coastal ecology. Many of them expressed through art, activities, and stories that it helped them understand how to “care” for nature and what they can do to help and prevent further
harm. However, this research could not conclusively evaluate how students “live” their ecoliteracy knowledge in their daily lives. Stories such as that of the students initiating the water bottle ban in their school indicate that the Ecorowing experience triggers further positive environmental action and can contribute to the “living” of ecoliteracy and ecological citizenship. Determining whether such impacts are program wide requires further research with more classes. I contend that the Ecorowing program provides a platform for ecological citizenship because in order to understand the needs, rights and responsibilities humans have within a broader ecological system, we first have to understand the needs, rights and relationships of the various co-inhabitants on our planet.

Understanding how the Ecorowing program fosters Ecoliteracy is somewhat more straightforward. Based on this research it is clear that providing young learners with a hands-on, authentic learning experience, in a complex natural ecosystem, provides a foundation for learning about ecology. According to the learners involved with this research, the single most important program attribute for their learning was the ability to observe living things in nature. While some of these observations took place during structured activities e.g. bird watching, the students who took part in this research also emphasized the value of informal observation opportunities e.g. during lunch. For many learners and teachers involved in this evaluation it was the excitement and joy created by an authentic contextual learning experience that provided the catalyst for further inquiry and examination during the program e.g. venturing into an unknown forest or learning about nudibranchs. The multitude of ecological interactions at the Esquimalt Lagoon provided the opportunity for students to observe complex ecological interactions first hand e.g. young seedlings growing out of nurse logs, sand dollars feeding in the lagoon or
the roll that trees play in the hydrological regime of the local creek. Just as Steve, a grade six student and Ecorowing participant commented in a previous section, sometimes you have to “get out there and actually be close to those things that you are learning about.”

The Importance of being Challenged by the Environment

For both the students and the teachers involved with this project it was important to be challenged. In part, the geographic location of the Esquimalt Lagoon provides an environment that challenges the students e.g. rain and temperature. For many of the students, the weather was one of the first things they noticed and yet by the end of their experience at Ecorowing, it was irrelevant. However, the experience of being in inclement weather also helped further their understanding of how animals and birds survive there. The students shared that overcoming challenges such as getting stuck on a sandbar during the rowing activity, was not only fun, but it also fostered teamwork, as did learning a new activity together such as rowing. The ability of Ecorowing to cultivate teamwork was also echoed by the teachers involved in the focus group who felt that the program helps bring their class together at the start of the school year.

The Importance of Fun

While the students often provided very articulate and informed conclusions about their learning process at Ecorowing, the importance of simply having fun was clearly emphasized. Activities that were deemed to be “fun” for the students seemed to be awarded a higher level of importance by the students. I feel that this is perhaps a self-explanatory finding, but it is worth noting, as I have observed a troubling trend in EE to
focus on what is wrong with or what is broken in the environment rather than on providing positive experiences in nature.

*The Importance of Creative Expression*

For the students involved in this research the most important activities were not necessarily the ones that provided direct hands-on science learning opportunities with the marine environment such as pH testing or microscope analysis. Instead, it was the program elements that allowed them to be creative e.g. making bracelets, making up stories or creating a charcoal drawing. One could argue that developing observation skills is a critical scientific tool, but I feel that these results indicate that EE program developers need to ensure that EE programs also include opportunities for creative expression and artistic learning. This “creative cross-meshing of ‘disciplines’” is especially important considering the trend to place EE under science learning in school curriculum as identified by the focus group participants.

*The Importance of Peaceful Moments for Reflection*

Some students described how nature had a calming effect on them, and how being in nature made them feel at peace. Both female and male students valued having time to enjoy and simply experience nature. It is important to ensure that opportunities for reflection and independent thought exist in EE programs.

*A Gateway to Further Exploration*

The *Ecorowing* program catalyzed increased outdoor exploration by both students and teachers beyond the program time frame. For example one student explained how his
newfound familiarity with nature now made him more comfortable in nature. Another student suggested that he enjoyed sharing his newly acquired marine knowledge with his younger sister. The teachers in the educator’s focus group spoke of the importance of the Ecorowing program as a stepping-stone for teachers to take their classes out in nature. However, it was also clear among the participants in the focus group that such self-guided nature trips should not replace the Ecorowing experience. Participants felt that the experience and expertise of the Ecorowing program educators was one of its strengths. Furthermore, it was cautioned that while encouraging teachers to take their classes outdoors was commendable, such encouragement should also be accompanied by appropriate mentoring to ensure that sensitive ecosystems are not harmed by detrimental student practices such as trampling sand dollar beds.

The Desire for More Time in Nature

The participating students, strongly stated that they wished for more time to observe wildlife and as one student put it so well “more time to just be in nature” during the Ecorowing program. The students enthusiastically shared how the Ecorowing program could be improved by having more time to explore the lagoon and surrounding forests. I find this a critical finding, as it indicates that students want to learn more and they want to do so by spending more time engaging with nature. Clearly there are limits to how long a field trip can be, especially considering that the Ecorowing program is already a day-long experience. However, the students’ plea for more time to be in nature and observe wildlife suggests that more such experiences throughout the school year would be appreciated by this group of students. During the educators’ focus group it was recognized that there needs to be more integration between the various EE providers in
the Victoria area so as to try and ensure that there is a continuum of outdoor nature experiences available for students throughout their academic life. Such integration could lead to an overall increase of time in nature for the students. Additionally, increased integration and communication between the various EE providers would also help prevent conflicts that arise as competition for funding becomes more intense between various groups.
Part B: The Seaquaria Program

The Relationship between the Seaquaria Program, Ecoliteracy, and Ecological Citizenship

The stated goal of the Seaquaria program is as follows:

The program fosters environmental awareness, engagement, respect and stewardship, while optimizing joint multi-disciplinary learning of teachers, students, and the community. The goal of the program is to help build a society that cares about the environment both emotionally and in practice, and to provide the basis for enduring learning skills in a changing world (Seaquaria, 2009).

Yet, as previously mentioned, staff participating in the program hold quite divergent views about its vision and purpose. One of the Seaquaria Directors, for example, said during the educators’ workshop that he felt that EE was a silo. He advocated that Seaquaria was a more holistic way of learning and was a vehicle for education. While I can appreciate this statement, it also creates a very broad definition of the program and leaves it with few tangible reference indicators.

I developed my research methodology on the understanding that the Seaquaria was an EE organization. Within that context I sought to evaluate if and how the program fostered ecoliteracy and ecological citizenship. The model that I developed for the research did not seek to study the program with respect to “science education” or as a
“vehicle for education”, and it did not explore other areas such as its capacity to connect with vulnerable students or develop career opportunities. These program aspects are worthy of focused future investigation.

The *Seaquaria* program is not unique in struggling with its identity and feeling that categories such as “science education” or “environmental education” are too restrictive. Yet the identity challenge was a significant barrier in being able to evaluate whether the *Seaquaria* program fostered ecoliteracy and ecological citizenship. As a consequence, the results of this research to determine whether the *Seaquaria* program fosters ecoliteracy and ecological citizenship remain inconclusive.

However, the evaluation did reveal a number of program strengths related to the development of ecoliteracy and ecological citizenship. These are discussed below, and are listed as: 1) the value of viewing living animals, 2) the opportunity to engage with species of animals not commonly seen (despite their close geographic proximity), 3) the ability for the *Seaquaria* to inspire further learning by both students and teachers, and 4) the program’s long-term sustainability.

*The Value of Viewing Living Animals*

Students give high marks to the *Seaquaria* with respect to the opportunity it presents for observing animals. Both students and teachers cite examples of how it fosters care and compassion of living things. The students and teachers shared stories of how the complex environment within the *Seaquaria* allowed them the opportunity to begin to understand the relationships between organisms and to develop their observation skills. The observations of complex marine relationships within the *Seaquaria* were felt to have a calming affect on frustrated and angry students. Lastly, the observation and relationship
opportunities that the *Seaquaria* provided were felt to provide a platform for discussion about anger and behavioral issues.

*Connecting to Your Local Seashore*

Both the student and adult participants in this research project noted the *Seaquaria*’s ability to provide an introduction to the diverse marine environment around Victoria. During the educators’ workshop it was felt that the *Seaquaria* provides a significant opportunity to bridge the gap that exists between the marine biodiversity of the region and the lack of knowledge and first-hand experience with such marine life.

*Inspiring Community-Based Learning*

The community-based learning model advocated by the program ensures that both students and teachers are actively involved as both learners and teachers. I feel that this model of learning fosters a more democratic learning environment. Students and teachers spoke about how the *Seaquaria* had created exciting learning opportunities.

*Sustainable Environmental Education Programs*

During the *Seaquaria* program educators’ workshop the long-term viability of the program was extensively discussed. *Seaquaria*’s continued growth as a program, coupled with the fact that not a single school has withdrawn from the program, was identified to be rare, from both an EE and conventional education programming perspective. Further research into why the program remains so successful is warranted and may be helpful for future program funding and planning.
The Difference Between Inside Marine Learning and Outdoor Marine Learning

As discussed previously, the class that took part in the Seaquaria research had also taken part in the Ecorowing program. This created challenges during the data analysis of the Seaquaria results as it was difficult to definitively attribute student learning outcomes to either program. At times, the Ecorowing and Seaquaria programs work in close partnership and often refer to one another during their programs. In fact, this type of program integration could serve as a model for cooperation between EE organizations called for in earlier chapters.

While this “overlap” caused challenges from an evaluation perspective it also presents an opportunity to contrast different approaches to EE or marine education. The Ecorowing program is strictly outdoor based, whereas with the exception of a beach trip, the majority of the Seaquaria programming takes place indoors.

During the voting activity the Seaquaria students involved in this research unequivocally identified the importance of the Ecorowing program in their marine learning experience. In fact, the enthusiasm for the Ecorowing program overshadowed all other learning experiences associated with the Seaquaria program.

One of the strengths of the Seaquaria is its constant presence throughout the school year and ease of accessibility. However, the students involved in this research also placed a clear importance on being outside and learning in nature. This may suggest that students place greater value on outdoor contextual learning experiences, than on indoor marine education. While it is my understanding that one of the intentions of the
Seaquaria program is to act as a stepping-stone for such outdoor learning, I think the conclusions of the students also serve to further support the suggestion that contextual outdoor learning is essential and valued by learners. In an era of restrictive school schedules, increased liability concerns and curriculum pressures, it is important to remember that classroom programs can not replace true hands-on learning in natural environments.

*Trying to Get the Most Out of Opportunities: Hitting the Limit of the Model*

Small EE organizations often operate on shoestring budgets and are run by individuals with tremendous passion and commitment to their organization’s mission. The lack of funding necessitates that the program directors and staff work long hours with little respite and have very little time to focus on things such as internal program evaluations. From a researcher’s perspective this can create a challenge, as understandably, program directors view evaluation opportunities (such as the one I was fortunate enough to have) as rare occurrences. This creates pressure to try and include as much as possible in the evaluation. It is as though this is their one shot at proving the value of the program to everyone and validating their success. However, the danger becomes that so much is brought into the evaluation that it broadens the discussion to the point where little determination can be made on any one particular program aspect.

In the context of this research project, the Ecorowing program provided a finite, quantifiable project, with clear parameters and objectives. In contrast, the Seaquaria program was diffuse and overwhelming. I was unable to determine the exact scope of the program despite a diversity of attempts to do so. The democratic nature of the workshops
encouraged participants to address those issues that they felt were of the most value to the program. Yet without clarity about what the program actually is, and what aspect is being evaluated, the workshop participants’ attention quickly shifted from the topic of ecoliteracy to other program areas such as fostering volunteer and employment opportunities.

This issue was further compounded by the decision to stretch limited research funding to cover two programs. This was a condition of the granting agency. Developing two totally separate evaluation processes was unrealistic, and thus I attempted to develop one framework that would benefit both programs. I searched for preexisting models that incorporated the values and principles of both organizations and used those to inform the evaluation that I conducted. Developing an evaluation system that would work for both a one-day outdoor experience, and for aquariums in school settings, exposes the limitations of a “one size fits all” approach. Throughout my research it became clear that while the developed evaluation model may be appropriate for the Ecorowing program, it is woefully inadequate for the Seaquaria program, in part because every class interacts with the Seaquaria in an entirely different manner. What is needed is clarity about the program’s identity and goals, as well as specific scoping and identification of program components such as the “LiveLab” or the high school level field program. I would strongly recommend this as a further area of research.

Is it Fair to Ask Children to Participate in Such Evaluations?

The ethics of engaging children in evaluations was explored in my literature review. My decision to involve the students was well meaning, based on academic
research and represented a legitimate attempt to incorporate the very values of student
centred and community learning that both programs advocate, Yet, during the second
Seaquaria students’ workshop I found myself wondering: ‘is this fair?’ I had assumed
throughout my research that students would want to share their stories, and that providing
them with the opportunity to be active agents in evaluating their own education would be
a positive and empowering learning experience. As I struggled to ensure that the
evaluation workshop remained relevant for the class and to find the appropriate
mechanisms to engage them, I wondered if the students were truly benefiting from this
experience. I wonder whether it would have been of greater benefit to the students to
have actually taken them outside on a field trip as opposed to discussing their learning in
a classroom. Furthermore, the time spent with me during the workshop was time that the
students could have been learning elements of their already packed curriculum.

Perhaps a more suitable alternative would be to incorporate evaluation and
increased student voice into the regular classroom curriculum. In this way, student
participation in evaluation would not be such a novel, one-off event. It would simply be
status quo. As discussed previously there are great benefits to allowing students to be
greater agents in their learning. In the context of EE, programs such as could incorporate
evaluation opportunities for students into their programming.

However, I also feel that this research has shown that it can be challenging to ask
students to think about their learning processes in EE. This was especially apparent
during the Seaquaria students’ workshops. An increase in evaluation participation by
students must also be accompanied by increased research into how students understand,
think about and discuss their learning in EE.
CONCLUSIONS AND RECOMMENDATIONS

The Challenge of Participatory Evaluation in the Current Educational System

This research documents some of the challenges with developing evaluation processes to involve program participants as active evaluators. There are limits to how “participatory” such evaluations can be within the confines of the current educational system. Temporal, curricular, and logistical obstacles create barriers to overcome. While this research was somewhat participatory in nature, some of the most fundamental principles of participatory evaluation, such as having the participants develop the research question or process the results were not possible. This does not indicate that participatory research is not possible, rather it suggests that there is a need for further development of participatory evaluation models that are appropriate for use in conventional school environments.

The Value of Student Perspectives

This research illustrates the value of student voice in academic research. The students provided insight into their program experiences that I would have been unable to attain either by testing the students with standardized tests/worksheets or by solely interviewing their teachers. The students shared powerful stories that illuminated their perspective as participants in the program. My hope is that this research will be part of
the answer to the call for an increase in student perspectives in EE research by researchers such as Nagel (2004) and Rickson (2001).

As I advocate for an increased role of youth-voice and input into their education, particularly in EE, I also caution that we, as program educators, developers, funders etc, must be cautious to not place additional tasks and burdens on children. After all, this research has made it clear that one of the very challenges facing EE and time spent outdoors are the ever increasing demands of curriculum, schooling and legal obligations. We need to find a balance between ensuring that students are active agents in their own learning, who are able to share their perspectives and thoughts, and allowing children to just be free to explore. Lastly, we (the adults of this world) need to ensure that we are also ready to not only listen to what children have to tell us during processes like evaluations, but also to act upon their suggestions, to ensure that such experiences do not become disempowering.

EE Curriculum Development

While this was only a pilot project and only a limited number of students took part in the study, this research provides interesting feedback and suggestions for EE curriculum developers and administrators. This study has shown the importance of providing students with opportunities that challenge them both physically and mentally. It has also illustrated that it is critical to ensure that EE is fun and engaging. Furthermore, it has shown that challenges can sometimes create fun opportunities e.g. getting stuck on a sandbar, and that challenges can create learning opportunities e.g. experiencing inclement weather at the lagoon and thus gaining insight into the hardships wildlife face.
While a key component of ecological literacy is understanding the relationships, facts, names, and characteristics of organisms, this research also serves to caution that science-based learning should not be the sole focus of EE programs. The participants in this study clearly emphasized the importance of opportunities to reflect and engage in creative activities, such as drawing or creating crafts, during EE programs.

Lastly, we continuously strive towards sustainability in our EE teachings, and in turn, we must also ensure that EE programs are sustainable and can develop the long-term relationships and stability to provide informed, experienced, and proven EE. As a society we can no longer treat EE programs as fringe benefits, they must receive adequate funding so as to be able to successfully embrace the tasks ahead.

*Ensuring Children Have Time in Nature*

As an environmental educator, I was both troubled and inspired by the findings of this research. I found the stories about a clear lack of connection to the local marine environment prior to participating in the programs that were made by the students, teachers, and educators involved deeply concerning. In my opinion the beaches, coves, and waterways around Victoria, BC, provide some of the most outstanding marine learning opportunities anywhere on this planet. The failure of local society, school boards, and governments to ensure that its members are strongly connected, informed and cognizant of the local marine ecosystem around us is a clear indication that we not only *should* do more, but that we *must* do more if we collectively want to ensure the preservation of the very ecosystems we depend upon, and from an ecological citizenship perspective, also have a moral obligation to protect.
In their review of how American children spend their time, Hofferth and Sandberg (2001) contend that increasingly less time is available for children to engage in discretionary activities such as outdoor play. They indicate that the average child spends 24% of their free time each week watching television. Clearly, as a society we need to ask ourselves some serious questions about what we choose to do with our time and how we (as adults) influence the time available for nature exploration among children.

In her review of research associated with significant life experiences that lead to environmental sensitivity, Chawala (1998) found that “there is no single all-potent experience that produces environmentally informed and active citizens, but many together” (p. 393). Recent research by Wells and Lekies (2006) suggests that “early experiences with the natural environment may indeed set a child on a trajectory toward environmentalism” (p.15). Additionally, Wells and Lekies (2006) found that “connections between childhood engagement with the natural environment and later life environmentalism are not limited to individuals who work as environmental educators or activists” (p. 15). This built on previous research by Chawala (1992, cited in Sobel, 2008) that indicated that the majority of environmentalists shared two fundamental past experiences. One, they spent significant time in nature during their childhood and two, they were often in the presence of an adult who shared with them the importance of respecting nature. Sobel (2008) summarizes this best by stating that “children need lots of time rambling in neighborhood woods and fields and a parent or teacher who cares about nature” (p. 14). Of course as Sobel (2008) identifies, not every child may have access to a special place in nature. Herein lies what I see as a tremendous positive opportunity for environmental learning in Victoria, BC.
Recognizing that we are privileged to live in one of the most ecological diverse regions on this planet, and recognizing that we are currently failing to ensure that all youth have a solid foundation in ecoliteracy, we have a fantastic opportunity to create an ecoliterate population. What is required is an increase in the preservation of green spaces and ecosystems to ensure that youth and adults alike have the ability to explore, play and learn in environments like the Esquimalt Lagoon. I contend that access to nature should not be a privilege but it should be a fundamental right, especially for children. Policy makers, school board administrators, and educators need to adopt more flexible curriculum and timetabling in order to ensure that appropriate time is made available to allow guided and unstructured learning in nature. Furthermore, increased funding must be allocated to initiatives such as Ecorowing and the Seaquaria programs that help bridge the gap between a lack of ecoliteracy and ecological citizenship.

As this research illustrates and Sobel (2008) so eloquently identifies “one transcendent experience in nature is worth 1000 nature facts” (p.16). In light of these findings, we must ensure that opportunities for unstructured play and exploration exist so that youth can freely explore, learn from, and develop an awe and respect for nature. Lastly, in all our efforts we need to ensure that we collectively become better listeners to children so as to insure that our intentions are truly meeting our goals and so that we can collaboratively engage them in the future.
REFERENCES


