

Marine Science and Beyond

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ABSTRACT

Developing a program that encourages students to connect with place can broaden the intrinsic value of an educational experience and ultimately create a passion for learning that transcends traditional classroom settings. Connecting to place is one of the primary goals of The Cape Eleuthera Island School – a semester-based, study-abroad program for high school sophomores and juniors located on Eleuthera, in The Bahamas. Our model applies four guiding principles to enhance the educational experience – *Immersion, Involvement, Ownership, and Legacy*. Research and outreach are two facets of our program that embody these principles. In both cases, students are immersed in their surroundings through place-based activities that focus on socioeconomic, environmental, and conservation issues important to communities on Eleuthera. Through research, students become involved in these issues by participating in projects that focus on topics such as the status of queen conch and Nassau grouper populations, coastal rehabilitation, and sustainable development. Students are involved in all aspects of their research project, from data collection and analysis to the presentation of their findings to local community members, government officials, and international scientists. In community outreach, Island School students are matched with students from local primary and middle schools. Our students apply and integrate their knowledge of local environmental and socioeconomic issues as they tutor school children in disciplines such as reading, writing, math, and computer skills. During research and outreach, our students develop a sense of pride and take ownership over their work (and interactions) because they are asked to address ‘real-world’ issues faced by local communities. Lastly, given that the research and outreach programs are ongoing and have long-term objectives, students become aware that they are contributing to a legacy that will continue beyond their time at The Cape Eleuthera Island School, further enhancing the educational experience. Students pursuing further learning opportunities in marine sciences and marine resource management is another form of educational legacy.

KEY WORDS: Experiential education, Cape Eleuthera Island School, Bahamas

La Escuela de la Isla de la Capa Eleuthera: La Inmersión, la Participación, la Propiedad, y el Legado como Principios para Aumentar la Educación en la Ciencia Marina y Más Allá

Desarrollar un programa que alenta a estudiantes para conectar con el lugar puede ensanchar el valor intrínseco de una experiencia educativa y últimamente crear una pasión para aprender que sobrepasa los escenarios tradicionales de aula. Conectar para colocar es uno de las metas primarias de La Escuela de la Isla de Capa Eleuthera – un semestre-basado, el programa de estudio-al exterior para estudiantes de segundo año de preparatoria y menor localizados en Eleuthera, en Las Bahamas. Nuestro modelo aplica cuatro principios indicadores para aumentar la experiencia educativa – la Inmersión, la Participación, la Propiedad, y el Legado. Investigación y alcance son dos facetas de nuestro programa que personifica estos principios. En ambos casos, los estudiantes son sumergidos en sus alrededores por las actividades de lugar-basó que enfocan en socioeconómica, ambiental, y la conservación publica importante a comunidades en Eleuthera. Por investigación, los estudiantes se lian en estos asuntos por tomar parte en proyectos que enfocan en temas tales como la posición de caracola de reina y poblaciones de grouper de Nassau, de rehabilitación costera, y del desarrollo sostenible. Los estudiantes son implicados en todos aspectos de su proyecto de investigación, de la colección de datos y análisis a la presentación de sus hallazgos a miembros locales de comunidad, a funcionarios de gobierno, y a científicos internacionales. En el alcance de la comunidad, estudiantes de Escuela de Isla son emparejados con estudiantes de escuelas locales, primarias y medianas. Nuestros estudiantes aplican e integran su conocimiento de asuntos locales, ambientales y socioeconómicas como ellos dan clases privadas a niños de escuela en disciplinas tales como leyendo, escribir, las matemáticas, y las habilidades de la computadora. Durante investigación y alcance, nuestros estudiantes desarrollan un sentido del orgullo y toman la propiedad sobre su trabajo e interacciones porque ellos son pedidos dirigir ‘mundo verdadero’ los asuntos encarados por comunidades locales. Ultimamente, dado que los programas de investigación y alcance están a ir y tienen los objetivos a largo plazo, los estudiantes llegan a ser enterados que ellos contribuyen a un legado que continuarán más allá de su tiempo en La Escuela de la Isla de Capa Eleuthera, aumentando aún más la experiencia educativa.

PALABRAS CLAVES: La educación de experiencia, la Escuela de la Isla de Capa Eleuthera, las Bahamas

ENHANCING EDUCATION

*“If you tell me, I will listen.
If you show me, I will see.
If you let me experience, I will learn.”*

Lao Tzu – (6th Century BC).

Learning, or the process of gaining knowledge or skills, can be enhanced if students, regardless of age, are given the opportunity to connect with a particular experience (Penick 1995, Conner et al. 1996). Learning through experience, in combination with general concepts taught in traditional classroom settings, can help stimulate the acquisition of knowledge and skills via multiple senses (i.e., visual, auditory, tactile, and kinesthetic) and thus cater to a range of learning styles (Conner et al. 1996).

In ‘experiential education’, observations, actions, and hands-on activities, are tools in the dynamic process of learning. However, to be effective, students must be consciously affected by an experience, and recognize their observations, actions, and activities as sources of knowledge (Penick 1995, Conner et al. 1996). As such, students entering an experiential learning environment must do so with a positive attitude and willingness to become active participants in the world around them (Penick 1995).

Experiential education, in combination with a passion for learning, helps students become critical, logical thinkers as they work to make sense of the experiences they are having. This innovative teaching style encourages students to ask questions, and, in some cases, take action to develop solutions to problems they confront (Penick 1995). The satisfaction of solving a problem helps engrain the value of the learning process, especially if the problem is ‘real’. Unfortunately, one drawback of experiential education is that rarely do students get to see the outcome of their actions, and thus, cannot reflect on them to effectively learn from the experience (Conner et al. 1996).

Marine science, and in particular, marine resource management, is one discipline where experiential education can help students effectively learn from the outcome of their actions. Essentially, experiential education that deals with helping people live sustainably with their environment adds a sense of purpose and promotes solution-orientated, critical thinking that enhances the process of learning (Braus 1995). Because marine science is interdisciplinary in nature, a learning-based approach that incorporates experiential education can help students better understand the complex interrelationships and processes that are often difficult to conceptualize in a traditional classroom setting.

GUIDING PRINCIPLES TO ENHANCE EDUCATION

Four principles can be used to help guide the development of an experiential program that enhances education and fosters a passion for learning that transcends traditional classroom settings.

Immersion

Anchoring learning opportunities to an immediate surrounding helps to create a connection to place. Place-based curriculum and hands-on, minds-on activities can facilitate the formation of this connection (Penick 1995). Once an initial connection to elements of the environment has been made, further cultivation of the relationship between person and place can help refine observation skills. Observations made by engaged learners can inspire the formation of questions and lead to deeper interest in the topic of inquiry.

Involvement

Students who are encouraged to actively explore their physical learning environment are more likely to become aware of the subtlety of their role and interactions with 'place'. Asking students to get involved through student-driven inquiries allows the learner to test theories through the direct application of their knowledge. Activities that encourage students to think while they are doing (Penick 1995), such as identifying and solving problems related to 'real world' socioeconomic, environmental, and conservation issues, can develop awareness of multifaceted perspectives, issues, and biases (Braus 1995).

Ownership

As interest, understanding, and awareness grow via experiences requiring the active and innovative application of knowledge (McTighe and Wiggins 1999), a sense of ownership and responsibility develops. A sense of ownership increases the value of an experience and students thus begin to take pride in their contributions. With ownership, students begin to critically reflect on challenges they have faced, which, in turn, promote the recognition of oversights in thinking and further advances a deeper understanding of issues (McTighe and Wiggins 1999, Sterling 2001). Once a learner takes ownership of 'real world' issues, they are prepared to recognize their role, and are more likely to generate potential solutions on a personal and community level (Sterling 2001).

Legacy

Legacy refers to aspects of educational programs that build on previous work, where 'real world' projects initiated by students continue to produce tangible outcomes. Presenting students with the opportunity to contribute to long-term initiatives reinforces a sense of ownership. In addition, designing legacy into an education program ultimately helps to validate the learning experience since students, and even teachers, can later reflect on the true value of their work.

CASE STUDY – CAPE ELEUTHERA ISLAND SCHOOL

The Cape Eleuthera Island School (IS) offers an innovative model for experiential education based on the guiding principles of *Immersion*, *Involvement*, *Ownership*, and *Legacy*. The IS offers international high school sophomores and juniors a semester-based experiential education program on Eleuthera, Bahamas.

Immersion

Integral to the success of the IS place-based curriculum are the daily interactions students have with their surroundings. Their journey begins on a small plane flying from Florida across the mottled Bahamas Banks. Shortly after arriving on Eleuthera, guided explorations of the marine world through SCUBA diving, snorkelling, and multiple day kayak trips immerse students in the local environment and foster a personal connection to place.

Students continue to be immersed in place through the academic curriculum that strives to apply concepts learned in class to the environment around them. For instance, the marine environment off Cape Eleuthera is used to provide examples of ecological theories for science class. Another part of the curriculum involves interacting with people in local communities, whether it is through home stays or the Community Outreach Program. Interacting with people in local communities enhances the sense of place and deepens the understanding of what ‘place’ represents.

Immersion and connection to place at IS also includes an understanding of the systems that support our day-to-day lives. Each student is asked to take a leadership role in a small community that strives to have minimal impact on the environment. Systems such as renewable energy sources, water collection, wastewater management, and building design support the IS campus and have been assembled with considerable thought to our ecological footprint. Concepts related to sustainable systems have been incorporated into course specific projects, seminar discussions, outreach initiatives, journaling assignments, and day-to-day living.

Involvement

The IS strives to ensure academic pursuits undertaken by our students can be applied outside the classroom. The Research Program and Community Outreach Program are two facets of the curriculum that involve students in learning opportunities that encourage critical thought and application of their knowledge. The scope of these programs extends beyond our institution and explores socioeconomic, environmental, and conservation issues.

The Research Program has student and faculty teams immersed and involved in focused research projects that explore environmental and socioeconomic challenges present on South Eleuthera. Several research projects focus on marine ecology and marine resource management. One focus is the health of queen conch, *Strombus gigas*, populations and whether a proposed marine protected area off Cape Eleuthera will be effective in conserving this important species. Students also monitor artificial reefs to assess their effectiveness at increasing habitat and the abundance of commercially valuable reef fish and

spiny lobster.

The Community Outreach Program provides a venue for IS students to become teachers and mentors, and gain confidence in sharing their knowledge of marine resource management and conservation with children in the local community. An important part of the outreach program is that IS school students plan the lessons they facilitate. Many of these lessons link traditional academic skills, such as reading and mathematics, to experiences had during kayaking, camping, and swimming. In addition, lessons also incorporate material on marine resource management and conservation as a way to promote environmental awareness in local communities.

Ownership

Students take ownership over all nuances of their research and community outreach projects. Given the right training and tools, IS students have shown they have the capacity to ask informed questions, contribute to the development of methodologies, collect and analyze data, and work closely with peers to prepare a collaborative research paper. In addition, students synthesize their findings into oral reports, and at the end of each semester present to their parents, government officials, scientists from colleges and universities, and members of local communities. The culmination of the Community Outreach Program is an event where participants showcase their semester accomplishments by performing dramatic productions, sharing their poster creations, and giving oral presentations and slide shows.

Legacy

Research projects that build on the knowledge and conclusions of successive semesters helps deepen the significance of the student's work, further enhancing the educational experience. For example, queen conch has been the focus of ongoing student research project for over four years. During this period, students have interviewed community members about fishing practices, quantified the harvest of juveniles, performed habitat surveys, and identified and delineated a queen conch nursery grounds. Currently, students are employing ecological design principles to build environmentally friendly, inexpensive raceways, to be used for the grow out of hatchery-reared queen conch. Student research on queen conch has provided important information that will assist in the planning of a proposed marine reserve for South Eleuthera (Clark et al. In Press, Danylchuk In Press), offering a significant socioeconomic, environmental, and conservational legacy for future students of the IS, the community of South Eleuthera, and The Bahamas.

Community outreach also has a legacy in terms of the quality of relationships that form between IS and Bahamian students. Many IS students maintain contact with their partners after their semester concludes. The partners continue to share life-experiences and unique perspectives beyond the educational setting. In addition, the aim of community outreach is to create a legacy by promoting conservation and environmental awareness, which may ultimately assist in the effective management of local resources.

CONCLUSIONS

The four principles of *Involvement*, *Immersion*, *Ownership*, and *Legacy* can work in concert to enhance education. Establishing and revisiting these principles when designing and implementing an educational program can encourage an enthusiasm for learning and promote the development of keen observation and critical thinking skills. As seen with the IS model, these skills help students achieve an advanced understanding of concepts taught in traditional classroom settings, while also promoting a solution-orientated reaction when confronted with complex issues. Based on our experience, marine science and marine resource management can be effective vehicles for experiential education.

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