*A unique relationship has been found between inquiry-based learning, outdoor education and success for all students, which is detailed in the following paper. Parkerscreek Primitive Technology structures their demonstrations around the principles of inquiry-based learning to provide a rewarding experience for all children.*

# AN ARENA TO EXCEL:
# *Inquiry-Learning and Outdoor Education for Students with Special Needs*

Christina Schindler, June 2002
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*"Tell me and I forget, show me and I remember, involve me and I understand."*
~ Author Unknown

Since no educational system can possibly offer students all the knowledge they will ever need, we as educators have an ethical responsibility to provide them with necessary tools to continue a life-long pursuit of learning. In a society where emphasis is placed on "what we know" it is difficult to embrace the importance of a "how we come to know" attitude. The concept of students constructing their own knowledge originated with educational theorist Lev Vygotsky, and was coined constructivism (Wells, 1997). This action-based approach to learning "*supports teachers in facilitating students reconstructing their own knowledge through a process of interacting with objects in the environment and engaging in higher-level thinking and problem solving*" (Crawford, 2000).

Later, John Dewey built upon the constructionist philosophy by developing inquiry-based learning, which "*emphasized the importance of involving students in the formation of the purposes which direct their activities and in selecting the kind of present experiences that live fruitfully and creatively in future experiences*" (Haury, 1993). With a strong foundation on student-centered, active learning, Dewey's model of inquiry provides a unique context for teaching all curricular themes, but most importantly it affords an arena for ALL students to excel (Crawford, 2000, Haury, 1993).

Interestingly enough, while reviewing current literature on inquiry-based learning, unique similarities began to emerge between inquiry-based learning and outdoor education. This literature review will attempt to connect these relationships by developing a unique path for incorporating inquiry learning in outdoor education, while supporting all students in a successful interdisciplinary experience.

**What is Inquiry Learning?**
Based on Dewey's philosophy that education originates with the curiosity of the learner and is grounded in real world experiences, inquiry learning can be defined as, an educational activity in which students individually or collectively investigate a set of phenomena - virtual or real - and draw conclusions about it. Students direct their own investigatory activity, but they may be prompted to formulate questions, plan their activity, and draw and justify conclusions about what they have learned (Kuhn, 2000).
Unlike the traditional scientific method, this path of instruction can be implemented across the curriculum. Even though inquiry teaching is often associated with science instruction, it transcends science instruction by providing a well-defined framework for students to investigate problems spanning all academic areas.
Inquiry is not a "method" of doing science, history, or any other subject, in which the obligatory first stage is a fixed, linear sequence is that of students each formulating questions to investigate. Rather, it is an approach to the chosen themes and topics in which the posing of real questions is positively encouraged, whenever they occur and by whoever they are asked (Wells, 1997).
As the literature indicated, inquiry provides a unique structure to explore numerous contextual issues. This concept will be explored further when the review explores inquiry's position in an outdoor educational arena.

**How Does Inquiry-Based Learning Differ from the Traditional Methods of Instruction?**
The traditional educational system in the United States does not promote a cycle of asking questions, seeking answers and reflecting on findings. Instead our schools primarily rely on mastery of content in a teacher-centered environment. Often students are conditioned not to question, listen intently and supply the expected answers. Emphasis is placed upon thinking what as opposed to thinking how. Assessment is frequently based on students regurgitating the right answer while the steps taken to reach that final stage are often overlooked. "The inquiry approach is more focused on using and learning content as a means to develop information processing and problem solving skills" (Inquiry-Based Learning Workshop, 2002). It offers a way for students to seek "appropriate resolutions to questions and issues," because, in reality, there is rarely one right answer (Inquiry-Based Learning Workshop, 2002).

When a teacher wishes to move towards a more student-centered, inquiry-based approach, the literature suggested that six key characteristics must be considered:
1. Situating instruction in authentic problems
2. Grappling with data
3. Collaboration of students and teacher
4. Connection with society
5. Teacher modeling behavior of scientist
6. Development of student ownership (Crawford, 2000).

In order to properly explore these aforementioned "six key characteristics," the redefinition of teachers' and students' roles need to be addressed. The literature provided numerous examples of the responsibilities both students and teachers have in an inquiry-based classroom. Before articulating the specific differences, Figure 1 offers a succinct overview for these new roles.

*Figure 1* **Inquiry as an Evolutionary Process**

| | Traditional Hands-On | Structured | Guided | Student Directed | Inquiry |
|---|---|---|---|---|---|
| **Topic** | Teacher | Teacher | Teacher | Teacher | Teacher/ Student |
| **Question** | Teacher | Teacher | Teacher | Teacher/ Student | Student |
| **Materials** | Teacher | Teacher | Teacher | Student | Student |
| **Procedures/ Design** | Teacher | Teacher | Teacher/ Student | Student | Student |
| **Results/ Analysis** | Teacher | Teacher/ Student | Student | Student | Student |
| **Conclusions** | Teacher | Student | Student | Student | Student |

(Bonnestetter, 1998)

**Redefining a Teacher's Role for Inquiry Teaching**

Collaborating with students, modeling proper techniques, asking open-ended questions, and reflecting on their own practice are just some of the roles successful teachers adopt in an inquiry-based classroom. Instead of leading group discussions, the teacher essentially becomes a participant in the learning process. The research stated numerous roles that teachers employ when using the inquiry model; specifically, Crawford identified the roles of motivator, diagnostician, guide, innovator, experimenter, researcher, modeler, mentor, collaborator, learner; all roles corresponded with the principles of constructivist teaching. She stated that a "*teacher's work in an inquiry classroom requires taking a myriad of roles - roles that demand a high level of expertise*" (2000).

Of all the roles identified, the literature most often stressed the importance of modeling proper techniques. "*Teachers model the skills students need to allow process understanding to grow: they model questioning, use planning templates, introduce reflective thinking, and emphasize de-briefing and group sharing skills* (Ash, Greene, & Austin, 2000). Stemming from these unique types of modeling, the literature overwhelming emphasized the importance of modeling effective questioning techniques. For example, Cheong (2000) noted that she, "*always start[s] by modeling how to ask questions that can be investigated, and eliminating or re-wording those that can't be investigated easily.*" Additionally, Bresnick (2000) stated, "*Modeling questioning gives the children a sense of what is reasonable to ask*." As one teacher observed, if you demonstrate proper questioning techniques, "*they begin to see that a question is a bridge between what they know and what they don't know, or what they want to know*" (Mott, 2000).

**Defining the Student's Role in an Inquiry-Based Classroom**

What is the importance of age-appropriateness in inquiry-based learning? Bresnick offered the following suggestion. While many educators may be doubtful that children as young as five and six years old have enough background knowledge, skills, stamina, or initiative to engage in independent investigations in science, I have found that they can and will with great success (Bresnick, 2000).

Similar sediments were continually echoed throughout the literature. Therefore, it is reasonable to assume that inquiry-based learning is not age restrictive.

*Connect Magazine* succinctly outlined the general characteristics attributed to students' roles in an inquiry-based classroom as follows:

- Students view themselves as learners in the process of learning.
- Students accept an "invitation to learn" and willingly engage in an exploration process.
- Students raise questions, propose explanations, and use observations.
- Students plan and carry out learning activities.
- Students communicate using a variety of methods.
- Students critique their learning methods (2002).

While other literature agreed with these broad roles, practicing teachers highlighted one specific characteristic at the heart of inquiry learning - ownership.

*The process of investigation became meaningful because the ownership came from student work and not from a worksheet created for them… Because they had already discovered it for themselves, they were able to understand the concept better than if I had showed it to them initially. This gave them a sense of ownership over their discovery* (Bresnick, 2000).

When deciding upon questions to investigate in an inquiry classroom, students' opinions are solicited and then implemented; this process authenticates the crucial ownership piece of inquiry learning. Opponents to this type of instruction often question the appropriateness student generated questions. To combat this argument, teachers in the literature stated how they use their role as collaborator to help formulate effective questions, while maintaining the retention of student ownership.

*Over the past year, I have come to see that if I limit the questions to a manageable number like five or six, students maintain ownership over what to investigate, and we also move towards the content I need to cover… This way, the students still have ownership over the questions they can choose and investigate* (Cheong, 2002).

In the beginning the children have a hard time articulating their discoveries , so I help them "find" the right words to explain what they have discovered. This is a crucial step, since it sets a tone that allows each child to "own" the experience while communicating it accurately" (Villavicencio, 2000).

This idea of ownership epitomizes the philosophy of inquiry learning and is often intertwined with all the roles students obtain in this type of learning environment. As one middle school teacher stated, "watching how involved students become in their inquiries is for me the greatest evidence of the power of scientific inquiry in the classroom, [because] they feel empowered at being able to make their own choices" (Marrero, 2000). The students*, [b]elieve they have the right (and the obligation) to understand things and make things work… believe that problems can be analyzed, that solutions often come from such analysis and that they are capable of that analysis… have a toolkit of problem-analysis tolls and good intuitions about when to use them … know how to ask questions, seek help and get enough information to solve problems… have habits of mind that lead them to actively use the toolkit of analysis skills* (1997).

This sense of ownership is the keystone to assuring that students will continue a lifetime of learning after their formal education has ended.

**Inquiry Learning in Outdoor Education**

One of the most important relationships investigated through inquiry learning centers around interrelationships. By providing students with a larger contextual framework that explores the relations between humans and nature, students are to understand "*different ways of viewing the world, communicating about it, and successfully coping with the questions and issues of daily living*" (Inquiry-Based Learning Workshop, 2002).

Well-designed inquiry learning activities and interactions should be set in a conceptual context so as to help students accumulate knowledge as they progress from grade to grade. Inquiry education should be taught with a greater understanding of the world in which they live, learn, communicate and work (Inquiry-Based Learning Workshop, 2002).

This concept of interrelationships that is deeply rooted in the philosophy of inquiry learning corresponds directly with the principles of outdoor education. As the research indicated, "*students are likely to begin to understand the natural world if they work directly with natural phenomena, using their senses to observe and using instruments to extend the power of their senses"* (Haury, 1993).

A characteristic of inquiry learning stressed throughout the literature was the idea that it can be done anywhere. This includes the out of doors - a fabulous learning environment that is rarely utilized in formal education. The following excerpts do in fact illustrate that some teachers realize the educational value this arena provides.

- *They [teachers across the country] know that inquiry can be practiced outdoors and indoors and in a wide variety of content areas (Ash, Greene & Austin, 2000).*
- *As they investigate in the classroom and out … (Villavicencio, 2000).*
- *The critical piece here is the underlying framework which the students developed through extended, first-hand experience on the school grounds. Without this understanding of a biome being defined by the climate, plants, and animals, their study could easily have been just a collection of facts about each region (Coulter, 2000).*

Teachers that cited the importance of conducting inquiry activities in an outdoor setting identified the critical relationship between students constructing their own knowledge in an investigative fashion and students developing an understanding for interrelationships by using the outdoors as a classroom. The literature substantiated their claim that "*the nature of outdoor education as experimental discipline gives students a meaningful context in which to become directly involved in knowledge construction"* (Clifford, 1992).
After identifying this strong correlation between the principles of inquiry and outdoor education, an additional connection emerged through the literature review. Apparently the principles of both inquiry learning and outdoor education provide a unique environment to foster the successful involvement of children with special needs. The remainder of this literature review will focus on this unique correlation that I observed between inquiry learning, outdoor education and including students with special needs.

**Special Education Students in an Outdoor Inquiry Setting**
There is a wide body of literature that proved inquiry learning can occur in an outdoor setting, since both the instructional method and the natural environment rely on the critical concept of interrelationships. While the literature established a parallel between inquiry learning and success for students with special needs, there was also present an undertone that suggested a correlation between outdoor education and success for students with special needs. Although nothing was specifically cited in the literature that related an inquiry learning experience in an outdoor setting for students with special needs, the relationship can be inferred from the vast amount of data that supported and highlighted the similarities between two types of learning methods and their benefit on students with disabilities.
The literature consistently illustrated that students with disabilities *"learned and recalled more on immediate and delayed recall tests when they were taught in the inquiry-oriented condition"* (Scruggs & Mastropieri, 1994). Specifically those students who had learning *disabilities "learned more content … when using a hands-on, inquiry oriented approach to learning than when studying from textbooks, workbooks, and teacher lecture"* (Scruggs, Mastropieri, Boon & Butcher, 2001). Paired with this success of content retention was a feeling of accomplishment and pride. This may have directly related to *"all students [interviewed in the study] express[ing] preference for inquiry-oriented materials over textbooks/worksheet materials"* (Scruggs & Mastropieri, 1994).
It was not suggested in the literature that students with disabilities were able to complete inquiry-based activities following the same guidelines as general education students. On the other hand, making appropriate adaptations was stressed in practically every article that discussed inquiry and students with special needs. Teachers made substantial adaptations in the science curricula to meet the special needs of their learners… Teachers used extensive redundancy and greatly reduced the pace in promoting acquisition and retention of relevant concepts. Vocabulary enhancement strategies, such as labelled pictures, posters and cognates were also employed… These strategies seemed to be helpful in enhancing vocabulary learning. Teachers also simplified recording sheets, recording observations for some students, and reduced individual responsibilities in cooperative groups. Additional adaptations were also made to provide additional redundancy and to help facilitate generalization objectives (Scruggs & Mastropieri, 1994).
The same types of adaptations were discussed in the outdoor education literature, but they focused more on physical modifications. *"Adaptations bridge the gap between the abilities of the participant and the demands of the activity"* (Sugerman, 2001). As the literature stated, adaptations in outdoor education needed to focus on three main areas:
1. Adapt on an individual basis.
2. Adapt only as necessary.
3. Adapt for functionality (Sugerman, 2001).

Regardless of adaptations, why do special education students excel in outdoor educational activities? Ruth Wilson attempted to answer this question in her article, Integrating Outdoor/Environmental Education into the Special Education Curriculum, where she found that *"with the place of outdoor education being the out-of-doors, the method of instruction lends itself to a variety of direct learning experiences. A similar hands-on, direct learning approach serves as the foundation for many special education curricula"* (Wilson, 1994). Stemming from her discoveries, Wilson developed four distinct arguments for including students with special needs in an outdoor educational program:
1. One argument supporting integrating outdoor/environmental education into the special education curriculum is based on the similarity of goals and objectives of these two different disciplines.
2. A second argument … centers on the motivational aspects of outdoor education. Research suggests that outdoor experiences can foster positive attitudes.
3. A third argument … rests on the potential of the outdoor setting for providing meaningful learning experiences in any area of study… Outdoor education is almost unlimited in terms of what the students might learn from an outdoor education experience. The setting is one that is appropriate for all age and ability levels and, thus, it is ideally suited for the individualized education plans.
4. A fourth and very strong justification … has to do with the importance of environmental education for all students.

Clearly, there is a need for students with special needs to be included in an environmental program. Their experiences will highlight the interrelationships between man and nature that are often stressed in environmental programs and provide all students, including those with special needs, the fundamental ideals of stewardship.

Researchers and theorists who study the psychological aspects of nature offer some interesting ideas, suggesting that a close relationship exists between understanding and caring for one's natural environment and understanding and caring for oneself and others (Campbell & Moyers, 1988; Partridge, 1984). As many children with special needs experience low self concept, poor social skills and learned helplessness (Ernst, 1990), fostering an attitude of stewardship toward the environment may be one way of helping them develop more positive self-concept, improved relationships with their peers, and a more internal focus of control (Burrus-Bammel & Bammel, 1990; Long, 1986) (Wilson, 1994).

This claim was substantiated in 1997, when Farnham and Mutie claimed *"individual behaviors found to be affected [by outdoor education] were self esteem, locus of control, and faith and confidence in peers. The group behaviors found to be affected were cohesion, clarity, homogeneity and problem solving.*" Some noteworthy comments from teachers partaking in the study included:

- *Subject P tried very hard in all the activities; his achievements were most noticeable in the gorge walk. His special needs presented severe physical difficulty in clinging onto the rock. However, he persevered and kept his own and the group's spirits up.*
- *Subject B improved in terms of participating over the week and joined in with the others, even playing football after dinner. He is usually reluctant to participate in group work and prefers his own company (Farnham & Mutrie, 1997).*

These examples illustrate the tremendous benefits afforded to students with disabilities when they participate in an outdoor educational experience. The learning may revolve around an inquiry-based activity or it may simply be a team/self building event; regardless, students with special needs are able to be involved in a meaningful, learning experience with their peers in a cooperative setting. What can be a more rewarding experience?

**Final Thoughts**

The review of the literature provided unique insights on inquiry learning, outdoor education and inclusion of students with special needs. Although the original focus of this literature review was to examine inquiry and outdoor education, a unique connection to special education emerged. After investigating that avenue further, I have some personal conclusions to draw from my review of the literature.

When discussing students with special needs in an inquiry-based classroom, the emphasis seemed to be on the academic side. Inquiry provides a meaningful, hands-on learning experience that targets multiple learning styles, thus allowing students with special needs a greater chance of success. Naturally with that feeling of accomplishment comes a sense of pride; stemming from a successfully inquiry experience, students with disabilities are able to construct their knowledge in a different way, thus becoming self-motivated.

When critiquing the literature on outdoor education and students with disabilities, a heavy emphasis was placed on the personal and group benefits, as opposed to the academic. It seemed that including students with special needs in an outdoor experience was a way for them to accomplish a once-thought "impossible" task, thus increasing their self-esteem.

In my own professional ventures, I would like to explore the connection between inquiry learning and outdoor education as an arena for students with special needs to develop both academic and social skills. Both types of learning provide the necessary principles, curriculum provides the context and the students provide the enthusiasm. This would truly be an interesting and worthy avenue to pursue, since both philosophies of inquiry learning and outdoor education promote the ideal of life-long learning for all people.

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