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Thinking in Outdoor Inquiry. ERIC Digest.

This digest contrasts the traditional view of learning characteristic of classroom instruction with the emerging "constructivist" view. This emerging view concerns how and why students learn, and it has a great deal to do with the instructional advantages of outdoor education. The discussion, therefore, illustrates the sorts of activities that teachers can undertake in the outdoors to help students develop the skills and

dispositions of thinking.

TWO VIEWS OF KNOWLEDGE

The traditional view of knowledge--represented all too often in actual classroom practice (e.g., Marzano and colleagues, 1988)--holds that students receive knowledge from the teacher. To demonstrate what they learn in this fashion, students reproduce information on tests, rather than by undertaking actual performances. According to some observers (e.g., Beyer, 1987; Jones, Palincsar, Ogle, & Carr, 1987; Resnick, 1989), classroom practice that adheres to this view accounts for much of the failure to teach thinking. Although developing the ability to think has long been the stated goal of schooling, educators did not begin to attend seriously to the teaching of thinking until the 1980s (Worsham & Stockton, 1986). "Constructivism" is a new theory of learning that is presently receiving much attention as an alternative to the traditional view of knowledge (Resnick, 1989). Constructivism, in Resnick's account, acknowledges three principles of learning:

- 1. Learning is a process of knowledge construction, not of absorbing and recording pieces of separate information.
- 2. Learning depends on previous knowledge as the principal means of constructing new knowledge.
- 3. Learning is closely related to the situation or context in which it takes place.

Four common findings from research about thinking ("cognitive theory") accord well with practice in outdoor education (Resnick & Klopfer, 1989):

- 1. Knowledge and expertise are the foundations for thinking and learning about certain topics.
- 2. The disposition to use skills and knowledge, as well as to possess them, is part of learning.

- 3. Social communities play a key role in developing thinking abilities.
- 4. Apprenticeships are powerful frameworks for learning.

Outdoor educators are uniquely qualified to apply these findings. The nature of outdoor education as an experiential discipline gives students a meaningful context in which to become directly involved in knowledge construction. Outdoor education--the instructional use of natural and built laboratories beyond the school to expand and enrich learning--developed, in large part, as a reaction to traditional classroom-bound teaching, in which students remained passive.

DEFINING THINKING AND LEARNING

Most researchers now accept the definition of thinking as a search for meaning, involving the mental processes that make sense out of experience. In fact, learning is thinking (Jones et al., 1987). That is, learning depends on prior knowledge and the specific mental strategies that evoke understanding in the learner. Beyer (1987) characterizes thinking as involving perception, prior experience, conscious manipulation, incubation, and intuition.

Recent research about memory has relevance, as well. For instance, Caine and Caine (1991) describe two kinds of memory systems, "taxon" and "locale." Taxon memories are best represented by traditional information-processing models of memory. Locale memory, on the other hand, automatically creates mental maps of our surroundings, maps that guide our movements and interactions safely and accurately. Examples of locale memory are recalling what we ate the day before or remembering a beautiful sunset. Outdoor education draws heavily upon locale memory to help students construct knowledge and meaning.

THE SCOPE OF THINKING SKILLS

The literature on thinking covers a wide range of topics. Resnick (1987) described six broad categories of thinking skills:

- 1. problem solving in the disciplines,
- 2. general problem solving,

- 3. reading and study strategies,
- 4. self-monitoring,
- 5. components of intelligence, and
- 6. informal logic and critical thinking.

Marzano and colleagues (1988) cite similar categories, but these authors also note that advocates of thinking skills offer a "bewildering" assortment of strategies for teaching such skills. Costa (1991), for instance, considers programs from more than 40 contributing authors. Moreover, few programs offer convincing evidence that students actually acquire targeted skills (Resnick, 1987).

Selecting any program is a dilemma. Do teachers stick with the traditional view of learning? If not, on what basis do they select from among the alternatives? Do they construct their own programs?

Perhaps the most reasonable advice is that outdoor educators should review and sample programs. In this way, they can discover which theoretical bases are most appropriate for their students, the settings in which they teach, and for their own teaching styles. If the emerging literature on thinking is correct in its assumptions about learning, teachers will, after all, eventually use what they learn to construct their own instructional models and routines.

SAMPLE APPLICATIONS TO OUTDOOR INQUIRY

A few examples will suggest the scope of what is possible and how it accords with recent findings of cognitive science. Teachers can consult the sources cited for further details of the sample applications.

Meeting experts on the job. Resnick and Klopfer (1989) found that knowing how experts think can be helpful in teaching others. (Experts, for example, often reason by analogy and do not rush to find a "correct" answer.) One application of this idea is to invite expert wildlife managers, soil conservationists, or foresters into the field to share with

students what they know and how they think.

Thinking aloud together. Teachers can ask students to be aware of what they are thinking as they perform specific tasks and to use that awareness to control what they are doing. This sort of awareness is called "metacognition" in the literature (e.g., Beyer, 1987). Both students and teachers can think aloud to let others become aware of what and how they think.

Forming concepts from experience. The formation of concepts, as Marzano and colleagues (1988) note, requires both experience and reflection. Outdoor settings present particularly good opportunities for concept development because instruction takes place in "the real world." For instance, a math lesson might require elementary students to manipulate land area measured in acres. The same lesson, taught outdoors, helps students conceptualize more clearly. By seeing and walking an acre they understand better the implications of their "paper and pencil" manipulations.

Examining natural and cultural objects. Outdoor educators could use one of the tools described by deBono (1983) to engage students in critical thinking. For instance "PMI" (Plus, Minus, and Interesting points) is a systematic way of helping students consider a phenomenon. With this technique, teachers might, for example, help students consider the way in which a landfill (or a monument, or a geological formation) relates to the surrounding environment. Another application is suggested by Perkins' (1986) "knowledge as design" technique. In this activity, students take up a natural object--a leaf, a snake, or a geode, for instance. The teacher poses questions (and guides discussion) about the object's purpose and structure, helps students to find model cases, and guides the development of arguments to explain and evaluate the object.

Using outdoor social groups. According to Resnick (1987), when lessons are learned in cooperative groups of mixed abilities, less knowledgeable and experienced students improve their performance. Group adventure activities--such as climbing a 12-foot wall or untangling arms entwined in a "human knot"--provide opportunities to promote thinking about group interactions and the nature of cooperation.

Generating interesting questions. Teachers who use good questions help students develop the capacity to think. One example of a school district using interesting questions to guide the K-6 curriculum is the Genesee River Valley Project in Rochester, New York. In that program, the river valley is used in conjunction with regular classroom instruction to engage students in investigating questions that deal with all subjects (see reference list for contact information).

CONCLUSION

Recent research about thinking, questioning, and reflecting on experience is a rich source of new ideas for outdoor educators. The research cited illustratively in this Digest

also tends to support the intentions that have guided outdoor education for many years. For more detailed information about the application of thinking skills in outdoor education--particularly in formal reflection (or "debriefing") sessions--consult "Lasting Lessons: A Teacher's Guide to Reflecting on Experience" (by Clifford Knapp, $10.00, postage paid, from ERIC/CRESS). This guidebook considers the relationship between experience and reflection, explains the purpose and design of reflection sessions, and includes sample activities and other teaching resources.

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For more information on the Genesee River Valley Project, write to Lee Miller, project facilitator, Dag Hammarskjold School No. 6, 595 Upper Falls Blvd., Rochester, NY 14605 (telephone: 716/546-7780).

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