
Teaching about History and Science through Archaeology Service Learning

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Experiential education, developed more than a century ago, is a guide for instructors interested in helping students capture the meaning of their learning experiences. John Dewey (1963) in *Experience and Education* emphasized that events are present and operative but that what concerns us is their meaning. Dewey judged the quality of an educational experience by its intellectual and moral benefits to the student and the long-term benefits to the community. For example, students may learn about ethics, character, and citizenship through the planned study of archaeology, but it is the instructor who is responsible for creating the situation, conditions for further growth of curiosity, and desire and purpose (Moe, Coleman, Fink, and Krejs 2002).

Lewin (1952) proposed that personal development occurs through the successful realization of goals achieved by a process of trial and error or through experimentation. That approach is a contrast to the one in which the authoritarian teacher determines what is important and necessary to achieve.

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Experiential education is different from the traditional education of the nineteenth century because of an added emphasis on subjective and objective knowledge in the process of creating knowledge through action and its emphasis on social rewards (National Society for Experiential Education 1997). Experiential education includes different types of individualized and group learning experiences. A popular form of experiential education is service learning, which aims to enhance students' understanding through active participation in community activities. According to Florida International University (2004), the goals of service-learning projects for young adults include the following:

- To enhance student learning by joining theory with experience and thought with action
- To assist students to see the relevance of the academic subject to the real world
- To develop an environment of collegial participation among students, faculty members, and the community
- To increase the civic and citizenship skills of students
- To develop a richer context for student learning

- To give students greater responsibility for their learning

Today, service-learning requirements are common for secondary and college students (Brown 1998). The National Service-Learning Cooperative (2002) defines service learning as a method of teaching and learning method that connects meaningful community-service experience with academic learning, personal growth, and civic responsibility.

According to a National Household Education Survey, 80 percent of public high schools offered service-learning opportunities during that year (Mintz and Liu 1994). Two-thirds of American schools arranged service work for students in grades six through twelve, matching opportunities with volunteers. Twenty-one percent of schools required that students complete a specific number of service hours before graduation. More than one-half of secondary students participated in service learning in 1999 (Kleiner and Chapman 1999).

To assess the benefits of engaging students in service learning, Eyler and Giles (1999) surveyed more than 1,500 students selected from twenty institutions of higher education to determine cognitive outcomes of service-learning projects. Students reported enhanced

understanding of course material, new awareness of complexity of personal and social issues, and practical ability to apply course content. Higher quality service-learning experiences fostered development of critical-thinking skills. In this article, I describe how participation in volunteer archaeology field work enhances students' understanding of the scientific method as applied to the study of human history. Ten important principles of good practice provided direction to program planners and educators (Cooper 2003).

Relationship of Service-Learning Experiences to Discipline-Specific Standards

Service learning is compatible with general and discipline-specific educational standards (Moe, Coleman, Fink, and Krejs 2002; Cooper 2003). The National Education Goals for the year 2000 emphasized preparing students for responsible citizenship, including involving America's students in community service activities (Brown 1998; Kleiner and Chapman 1999). Specific social studies and science standards are compatible with planned experiences for student service learning. The National Council for the Social Studies (NCSS 2003) promotes a set of curriculum standards and performance expectations. Three of the ten thematic strands are particularly relevant to experiential education through archaeology projects: culture; time, continuity, and change; and people, places, and environments. The culture strand includes "experiences that provide for the study of culture and cultural diversity." The second strand of time, continuity and change includes "experiences that provide for the study of the ways human beings view themselves in and over time." Finally, the strand of people, places and environments includes "experiences that provide for the study of people, places, and environments." States may elect to use those strands as a guide in the development of local curricula. Table 1 contains selected content standards for the disciplines of social studies and science that were approved

by the Alabama State Board of Education to guide classroom and field instruction. By using a combination of instructional methods (lecture, reading and writing assignments, laboratory and field experiences), teachers increase the likelihood of achieving those content standards.

Archaeology offers a unique opportunity for interdisciplinary learning

(Mamola and Bloodgood 2002). According to Cooper (2003), "teaching archaeology enhances students' proficiency in critical thinking and reveals to them the process of historical interpretation." Archaeology service learning is distinctive from volunteer work because "it affords active learning through workplace experience and reflection" (Brown 1998).

TABLE 1. Selected State Content Standards by Discipline Compatible with Experiential Learning in Archaeology

Discipline	Grade level and focus	Content standard
Social Studies	10—U.S. History and Geography: Beginnings to 1900	<ol style="list-style-type: none"> 1. Trace life in the Americas before the arrival of Europeans and Africans. 2. Trace the development of early English settlements and colonies. 3. Analyze the roles of free Blacks and women in colonial America. 4. Analyze the colonists' relationships with Native Americans. 5. Examine the transition from colonial to state governments. 6. Discuss Thomas Jefferson's purchase of the Louisiana Territory and its effect on the nation.
Science	9–12	<ol style="list-style-type: none"> 1. Conduct scientific investigations systematically. 2. Exhibit attitudes and habits appropriate to the scientific enterprise consistently. 3. Demonstrate correct care and safe use of instruments and equipment. 4. Apply critical and integrated science-thinking skills. 5. Use written and oral communication skills to present and explain scientific phenomena and concepts individually or in collaborative groups using technical and non-technical language.
Science	8	<ol style="list-style-type: none"> 1. Identify questions that can be answered through scientific investigations. 2. Design experiments and use appropriate tools and technology to gather, analyze, and interpret data. 3. Use proper procedures in the handling and care of living organisms and specimens derived from living things. 4. Use appropriate skills to design and conduct a scientific investigation. 5. Explain relationships between evidence and explanations. 6. Communicate orally and in writing scientific procedures and explanations.

Source: Alabama State Department of Education. *Course of Study: Science*, Bulletin 2001, no. 20. Montgomery, AL: Classroom Improvement.
Alabama State Department of Education. *Course of Study: Social Studies*, Bulletin 1998, no. 18. Montgomery, AL: Classroom Improvement.

It is certainly possible for groups of middle and high school students to learn about social studies and to participate in outdoor recreational activities. With planned classroom activities, teachers can introduce students to the scientific method and have them apply research skills during their study of the past inhabitants of a specific region.

Many states offer volunteer archaeology field experiences through universities, archaeological and anthropological societies, and museums. These are ideal opportunities for student field trips and parent-child excursions. Social studies teachers may help parents to understand the connections between field work and reaching standards for student achievement. For instance, the Alabama Museum of Natural History has formed partnerships with high school history teachers and guidance counselors to recruit and select student participants for its summer field school.

Archaeology projects vary according to the instructional goals of the social studies classroom teacher. Although not all teachers can supervise off-campus visits to observe archaeologists at excavations or conservation sites, they can develop a WebQuest student research project (see online examples and template for teachers at <http://school.discovery.com/schrockguide/webquest/webquest.html>). Teacher Kathy Foulke developed an *Ancient Rome WebQuest* in 1997 (DiscoverySchool.com 2003). Her aims were to facilitate student group work to research the similarities between Roman civilization and our own and to explore how Roman civilization has influenced us. *Medieval Japan Newspaper WebQuest* (Heath n.d.) is another example of a social studies research project for teaching students about the culture of a past civilization.

An Educator's Experiences

During the summers of 2001–03, my children and I participated in three different archaeology field expeditions held in three southeastern states. The first was a joint field school venture in the George Washington National Forest, conducted by the USDA Forest

Service (FS) and the Archeological Society of Virginia. The second summer, we were at an FS laboratory school in the DeSoto National Forest in coastal Mississippi. The third was hosted by the University of Alabama Museum of Natural History at San Estevan in remote southwestern Alabama. That was the site of a former settlement established on the frontier of the Mississippi territory in the early nineteenth century.

Our family's primary goals were to learn and play together outdoors and to become self-sufficient when apart from modern conveniences and technology. We successfully combined family camping vacations with volunteer fieldwork—learning while recreating. Our secondary goal was to satisfy university and high school community service-learning requirements. We accomplished all goals.

The natural scenery of each site was spectacular. Hidden Valley is nestled in a secluded area near the resort villages of Warm Springs and Hot Springs, Virginia. On our way to the field site, we visited Falling Springs Water Fall, described by Thomas Jefferson as one of the great natural wonders of Virginia. After days of fieldwork, tired muscles found relief in the Jefferson Baths, hot mineral springs used for healing for centuries.

In Mississippi, we cavorted in warm clear lake waters adjacent to our tent site at the conclusion of each day in the laboratory. The campsite was in Flint Creek Waterpark, part of the Pat Harrison Waterway District. The Tombigbee River flowed adjacent to the Alabama site. During our free time, we swam in a clean and refreshing lake created in an abandoned limestone quarry and hunted marine fossils from the Oligocene and Eocene eras.

While hiking along fields and rocky river beds in each state, we came upon diverse fauna: buck deer, does and fawns, rabbits, turkey, turtles, one splashy beaver, an elusive mountain cat, frogs and salamanders, and a myriad of insects. We gladly joined other archaeology volunteers to share fellowship, meals, stories, songs, and games.

The Passport in Time Program

Passport in Time (PIT) is an exciting volunteer archaeology and historic preservation program of the Forest Service. Individuals and families learn through experiential field and laboratory work that can last several days or weeks. Throughout the year, PIT volunteers learn to survey and excavate archaeological sites, rehabilitate rock art and historic sites, gather oral histories and archival data, and write interpretive brochures for future visitors. PIT sites are numerous across the national forests, grasslands, and prairies managed by the USDA Forest Service. The print and online PIT newsletter features stories about past projects, future opportunities, and accomplishments of service learners (Passport in Time 2001; USDA Forest Service, Southern Region 1998).

Gordon Peters, the founder of PIT, taught field schools at FS sites in Minnesota. Naturalists from lakeside resorts brought guests to see archeologists at work, and that became a popular outing. In response to requests from the naturalists and FS interpretive specialists, Peters agreed to continue his fieldwork and invite volunteers to participate. "That was the beginning of something beautiful!" Peters said (Passport in Time 2001).

In 1989–90, the project expanded to FS sites in Minnesota, Wisconsin, Michigan, and Utah. In 1991, archaeologist Mike Beckes convinced FS administrators to recognize PIT officially as a national program. Since its inception, PIT projects have been conducted in 117 national forests in thirty-six states. Many of those sites would not have been thoroughly investigated without the efforts of dedicated adult and youth volunteers. According to the program's officials, "Volunteers have helped to stabilize ancient cliff dwellings in New Mexico, excavate a 10,000-year-old village site in Minnesota, restore a historic lookout tower in Oregon, clean vandalized rock art in Colorado, survey for sites in a rugged Montana wilderness, and excavate a nineteenth-century Chinese mining site in Hell's Canyon in Idaho" (Passport in Time 2001).

University of Alabama Field School

The University of Alabama Museum of Natural History sponsors a related archaeology field school. The museum's origins date from 1831 with the establishment of its first natural history specimens. The museum collections were reestablished in 1872 after destruction by fire during the Civil War. Today, holdings include the only meteorite known to have struck a human; fossils; and rocks and minerals from the Coal, Dinosaur, and Ice Ages; there are also changing exhibits. Moundville Archaeological Park, a 320-acre National Historic Landmark, was added to the museum in 1929. Moundville contains more than twenty preserved fourteenth-century Indian mounds (Hall 2003).

For the past twenty-five years, high school and college students have worked under the close supervision of museum staff members, experienced student peer leaders, and contract archaeologists to study prehistoric and historic sites in Alabama and Mississippi. The first field school site was Moundville Archaeological Park. The University of Alabama Field School was established for two purposes: to increase high school students' interest in sciences and to recruit bright and talented students to enroll at the university (Hall 2003). The mean age of student volunteers is fourteen years. Adult volunteers are welcome to work cooperatively with the target audience of high school students. Readers can learn more about past expeditions at <http://www.amnh.ua.edu/exp24retro.html>.

Participants

Volunteers for the three projects came from many states—Alabama, Colorado, Florida, Georgia, Mississippi, Ohio, Texas, Virginia, West Virginia, and the District of Columbia. High school and college students worked in small field teams that varied in size from four to twelve members, depending on assigned tasks. All teams in Virginia, Mississippi, and Alabama included youths and adults working together. Each age group benefited from the perspectives of the other.

The adult volunteers were a diverse group of retired seniors, a lawyer, a medical office manager, other professionals, and high school and college teachers enjoying a different type of vacation. The naturalist and historians were Alabama state employees who sought to develop more effective teaching strategies for history and science, engage youth in conservation projects,

social studies. Two aims were to have students gain appreciation and interest in the sciences, natural history, and archaeology and to learn to apply the scientific method to planning and conducting excavations of prehistoric and historic sites. Service-learning projects may vary from single day visits to a historic site to extended fieldwork lasting several days.

The University of Alabama Museum of Natural History sponsors an archaeology field school. The museum dates from 1831, and its holdings include the only meteorite known to have struck a human.

and encourage future college enrollment. Most team leaders were experienced college students. Team members shared equal responsibility to maintain safe, clean, and secure campsites and excavation areas.

American volunteers felt fortunate to share our natural wonders and culture with international graduate students who hailed from the United Kingdom, Northern Ireland, and New Zealand. Those students were participants in a cooperative residency program with USDA Forest Service.

Principles of Good Practice

Program sponsors incorporated ten important principles of good practice into the archaeology service-learning projects: intention, planning, orientation, clarity, authenticity, monitoring, reflection, evaluation, recognition, and continuous improvement (National Society for Experiential Education 1997). Social studies teachers and their students can apply these ten principles to judge the merits of similar projects that offer service learning or course credit outside planned classroom experiences.

A first step for sponsors and educators was to define specific learning and knowledge that they intended students to gain from service-learning projects in

Sponsors began planning more than one year before the expeditions began, selecting and mapping sites, obtaining test auger samples, meeting local residents, and obtaining required federal and state permits. School site partners in each state (teachers and administrators) helped to determine which grades and classes would visit ongoing excavations. Although several schools wanted to bring entire grades to visit field sites, administrators limited the number of student observers on a single day to avoid damage to sites and artifacts and possible injuries to students.

Six months before summer expeditions, sponsors were busy hiring and training team leaders, promoting program participation among schools, and soliciting volunteer applications from adults and students. Planning steps during the spring included obtaining medical and personal information from volunteers; gathering release-from-liability forms; mailing maps and driving directions; assembling equipment, tools, and foodstuffs; and securing approval for high school course credit. The month before their arrival at the expeditions, the student and adult volunteers received written and electronic material as an orientation to the history of the site. Teachers will find that books with a regional focus on archaeology are useful to orient students (Mamola and

Bloodgood 2002; Samford and Ribblett 1995; Zschomler and Brown 1996).

On the way to the Alabama site, we joined the members of the Alabama Archaeological Society in Montgomery, the capital. The curator of the Native American and antebellum collections led the group in a private tour of the extensive collections of the state archives, which helped us grasp the culture of the ancient peoples who lived in the area of excavation. That was a rare opportunity not usually offered to students or the general public.

Ongoing communication was essential to achieve clarity of purpose. Oral presentation and written materials presented volunteer expectations, responsibilities, project timelines, and projected outcomes of archaeology fieldwork.

Working at the Site

When we arrived at field sites in Virginia, Mississippi, and Alabama, the project sponsors oriented the volunteers to the natural history of the field site and the lifestyles and descendants of early inhabitants. We learned the results of past work and viewed samples of artifacts that we were likely to discover. In Alabama, the students toured a local county museum with a collection of artifacts.

Sponsors and educators presented protocols and procedures to follow when excavating or identifying and preparing artifacts for laboratory study. Those included methods of dry and wet screening, reporting significant finds, preserving all artifacts, and protecting excavation sites (Mamola and Bloodgood 2002; Hall 2003; Passport in Time and Archaeological Society of Virginia 2001; Johnson 2003). Student and adult volunteers learned to apply the scientific method to archaeology fieldwork. Experienced college students or adult volunteers supervised the work of the youngest students. Our tasks varied from careful excavation to identification and classification of human and natural artifacts.

Historic artifacts were identified, labeled, recorded, and separately bagged. All artifacts were separated as

lithic (stone or rock), ceramics, bone, and historic (metal, wood, brick, glass). Lithics were separated, weighed, labeled, and bagged. Fine details of pottery fragments were examined, such as the grain size, type of temper, hardness, surface decoration, average thickness, surface and interior colors, and rim type.

The Tools We Used

Students and adults used simple tools and keen observation skills. Their equipment included shovels, trowels, five-gallon buckets, wheelbarrows, tarps, scale, wire mesh screen, saw horses, graph paper, rulers, plumb bobs, measuring tapes, stakes and string, camera, artifact sizing boxes, classification guides, log books, bags, markers, and personal journals. Because several tools required practice for accurate use, students worked beside project leaders to minimize errors of identification and curation.

Monitoring and Evaluation

All volunteers were monitored by project leaders, professional archaeologists, historians, and archaeologists-in-training. Levels of monitoring included on-site review by team leaders and peers, individual reflection of tasks completed (Cooper 2002), comparison of results to field guides, and a daily presentation to share discoveries with project leaders and members of other teams. Project leaders ensured that volunteers were hydrated and protected from the elements, and outdoor work was halted in the event of lightning and thunderstorms.

Leaders repeated instructions as often as necessary, giving detailed explanations about the importance of protocol and ethical practices. Project leaders and professional archaeologists corrected our errors, a level of careful supervision rarely offered to volunteers in other settings. Team members cooperated, asked questions, and celebrated achievements. The student and adult volunteers became more confident with each day's efforts and

learned to help one another with difficult tasks.

At the conclusion of the project, volunteers completed simple evaluation forms on which they reflected on their experience and offered suggestions to the sponsors for improvement. Each volunteer wrote of expedition highlights, satisfaction with orientation and training, and changes he or she would make as project leader.

Outcomes

It was challenging to focus our attention on a single plot of earth, five feet wide by five feet long, or to work in a small station within a field laboratory. The hot southeastern summer days and a tropical storm during the Alabama expedition were distractions while in the field. Some of the younger volunteers were unused to long periods of outdoor labor and needed adult encouragement and rest breaks.

We uncovered evidence of habitation by early Native Americans at the Virginia and Mississippi sites and remnants of a frontier hotel at the Alabama site. We marveled at simple objects that were crafted six centuries ago—stone handtools, biface points, and pottery indented with plant material and thumbnail imprints. Alabama team members excitedly shared artifacts of early nineteenth-century frontier life: teeth and bones of pigs, deer, fowl, fish, and cattle; Spanish and early American coins; an intricate compass; hand-painted porcelain ware; silverware; carved and polished oyster shells; clay marbles; buttons of brass, bone, and clay; pipe stems and bowls; stoneware ink jars; dark, thick glass bottles; and wafer-thin window glass.

Student and adult volunteers relaxed as they worked, sharing jokes and anecdotes. There was friendly competition between teams trying to find the most surprising artifacts. We shared new discoveries and searched field guides for information about their production and use. Daily team meetings permitted us to share discoveries, ask questions of the experts, record our observations, and view natural history specimens.

Conclusion

Project sponsors followed the ten principles of good practice for the experiential education archaeology projects (National Society for Experiential Education 1997), which social studies teachers can apply when selecting local projects for student participation. Participants received many rewards. Recognition by the Forest Service included awarding each participant a patch, button, and PIT Passport to document the field site, date, and hours worked, and the PIT moose logo. The University of Alabama's recognition packet included a CD-ROM of digital images taken during the field camp, a personal note of thanks, and an invitation from the camp director to return next year. Some students earned high school and college credit through program participation in Alabama and Mississippi. For many, the intangible rewards were the more important; they had acquired a new sense of kinship with prehistoric and historic residents of the southeast and a deeper understanding of human history. Recreation through active learning had afforded them exceptional opportunities for history to come to life.

Outdoor exploration was a healthy alternative to students' sedentary pursuits on summer vacation. All arose at dawn and worked a full day. Teens and adults were considered equal members of field and laboratory teams, performing the same meaningful tasks. Teenage volunteers gathered and packed supplies. Project sponsors taught them to maintain neat and safe campsites. Each shared in meal preparation. Many seemed to thrive on the increased responsibility and the extra attention that they received from team leaders, professional staff, and adult volunteers. We marveled at how hot summer days passed quickly when we were intensely engaged in the process of discovery.

Student and adult volunteers learned to appreciate the tedious and dedicated work of professional archaeologists while honing skills of classification, mea-

surement, and recording artifacts. Several students remarked that experiential education encouraged them to consider archaeology, paleontology, or another field science as potential career choices, which was one of the project's aims.

Friendships were formed with the other volunteers and professional archaeologists as we shared lunch in the field and dinner at the campsite, swapped stories and discoveries, and studied the scientific method and natural history. Volunteers at each site posed for group photos and enjoyed evening games, stories, skits and songs. We found it difficult to leave at the end of each project, and we definitely plan to participate in other field schools.

Key words: archaeology, content standards, experiential education, service-learning, social studies, science

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