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Ron Schukar

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Ron Schukar

Enhancing the Middle School Curriculum Through Service Learning

ON A WARM APRIL MORNING, 80 eighth-grade students from North Middle School in Aurora, Colorado, gathered in nearby Sand Creek Park to erect bat houses. "Why bat houses?" a local news reporter asked. "To control the insect population," one of the students answered. "We have reclaimed this park for all the plant and animal species that live here and for the people of our community who want to enjoy the surroundings," another student offered. "Because of the water and foliage, insects, especially mosquitoes, are a problem. We don't want the city to apply insecticides in the park, so we are trying to encourage bats into the park. In class we learned that bats consume thousands of insects each day." "Yeah," another student said with obvious pride, "build it and they will come."

Bat house construction in Sand Creek Park exemplifies the type of service learning projects developed by teams of middle school teachers from the states of Colorado, New Mexico, and Arizona under a teacher enhancement grant from the National Science Foundation. During the summer of 1993, eight teams, and again in 1994 another eight teams from the three states, including the North Middle School team, developed and later implemented integrated science and social studies curriculum units that were enhanced by a service component. As the voices of the students involved

in the Sand Creek Park project clearly articulate, students not only worked to resolve problems and issues in local communities, they did so in the context of the curriculum and with a vigorous appreciation of and excitement for learning and understanding.

This article discusses the connection between middle school instructional goals and service learning as a new and exciting instructional methodology. Particular emphasis is placed on the relationships between middle school science, social studies, and service learning. The article shows how service learning supports several national science and social studies content standards. The article concludes with a survey of evaluation findings generated from the National Science Foundation service learning project.

Service Learning at the Middle School

Middle school teachers who have embraced service learning as an instructional methodology understand the remarkable compatibility between instructional philosophy and practice at the middle level and the goals of service learning. For example, in 1981 Hurd, Robinson, McConnell, and Ross identified the following as among the essential characteristics of middle schools: interdisciplinary learning and interdisciplinary team instruction, flexible scheduling, emphasis on decision-making and problem-solving skills, use of varied instructional approaches, programs that encourage exploration

Ron Schukar is a staff associate with the Social Science Education Consortium, Boulder, CO.

and personal development, and positive and active learning environments.

These characteristics generally parallel the criteria for service learning defined by The National and Community Service Act of 1990. According to this document, service learning is a method:

- (a) under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with the school and community;
- (b) that is integrated into students' academic curriculum or provides structured time for students to think, talk, or write about what the student did and saw during the actual service activity;
- (c) that provides students with opportunities to use newly acquired skills and knowledge in real-life situations in their own communities;
- (d) that enhances what is taught in school by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others. (Cairn & Kielsmeier, 1991, p. 17)

Additionally, the commonly agreed-upon middle school student outcomes of personal growth and development, social growth and development, and intellectual development and academic learning closely correspond to the often-mentioned student outcomes for service learning programs of capacity for action, self-worth, citizenship, and academic skill development.

Service learning is often viewed as a means for achieving curricular reform at the middle level. Often lagging behind structural changes, curriculum and instruction at the middle school level must change if middle school structure is to be maximized and middle school philosophy realized.

One of the principal goals of middle level education is to create learning opportunities that are student centered and provide for student responsibility for learning. In service-learning enhanced curriculums at the middle school level, the "learner as doer" moves to the center of the educational stage. Teachers and students share in learning with students encouraged to assume responsibility for their own learning. At North Middle School, the idea of building bat houses in Sand Creek Park was suggested by students following a conversation they had with city parks and recreation officials. Much of the success of the

project resulted from teachers encouraging students to gather information beyond the classroom and to then assume responsibility for applying that learning to resolve an identified problem.

Middle school philosophy stresses that students be provided opportunities to "rub elbows with the real world." In middle school curriculums that contain a service learning component, the community becomes a learning laboratory. Learning is authentic, which is to say that students are called upon to apply subject matter learned both in and out of the classroom to identifiable and significant community concerns. In the Sand Creek Park Project, knowledge of ecosystems and human impacts on the environment came alive to students as a result of their work in the park and their interactions with park officials and environmental experts.

At the heart of middle school philosophy is a belief that the organization of the curriculum should transcend separate subject areas. One of the primary curriculum organizers for accomplishing this goal suggests focusing on themes that emerge from the concerns of middle school students themselves. Through service learning experiences, schooling is linked to issues and questions of significance to students. Students learn to ask questions and devise answers to the questions. Again, the Sand Creek Park project provides a good example of the actualization of this goal. Although teachers devised the curricular and instructional components of the Sand Creek Park unit, it was the students who made the decisions about the service learning project. The students chose Sand Creek Park because they recognized a need and believed that they could work to make a difference.

Developing healthy student-teacher relationships is another major goal of middle level education. By working together in service learning projects, close relationships between teachers and students are enhanced. Many teachers who implement service learning projects describe more positive feelings about their students as well as increases in the importance of their roles as teachers. Amy Rogers, one of the Sand Creek Park project teachers at North Middle School writes the following about her experiences with students in the project

During this project I learned how powerful service learning can be. The students changed Sand Creek

Park for the better by cleaning up and building bat houses. But even more important, the students themselves were changed. These students, despite their diverse backgrounds and uncertain futures, came together believing in themselves and their ability to change their community. They came away from the project empowered with the knowledge that they can make a difference. As a result, I also came away with the belief in my ability to make a difference in my students' lives. (Schukar, Johnson, & Singleton, 1996, pp. 98-99)

The symbiotic relationship between service and middle-level education was identified as early as 1989. The well-read report, *Turning Points: Preparing American Youth for the 21st Century*, suggests that youth service in the community become a part of the core program in middle school education. The report notes further that youth service is an important link between schools and the community and is a means for the community to "educate all of its young adolescents to become competent, responsible, and productive adults" (Carnegie Council, 1989, p. 70).

Middle School Science and Service

As noted previously, although there has been significant movement toward the middle school concept in the past several years, serious problems in institutionalizing the changes have occurred because curricular and instructional adaptations have lagged behind structural change. Middle school science education is no exception. When the goals, format, and features of middle-level science programs are measured against the characteristics of middle education outlined above, the results are discouraging.

For example, in the late 1980s, 90 percent of middle/junior high level science programs were represented by factually oriented textbooks and based on the premise that students must develop a content background before moving on to concept and inquiry based instruction. Goals of these traditional middle level science programs included the following: present fundamental principles in each discipline, acquaint students with the process of scientific inquiry, help students acquire scientific attitudes, and assist students to acquire skills associated with basic scientific inquiry. Scientific inquiry was typically achieved through laboratory experiments delivered as separate and periodic experiences rather than as integrated and regular

components of the middle level science course (Bybee & Giese, 1992).

According to the report, *Science and Technology Education for the Middle Years: Frameworks for Curriculum and Instruction*, the elements missing from many traditional middle-level science programs, but fundamental to the philosophy of middle school learning, include the following: relating scientific concepts and inquiry to real life social issues; developing personal and social decision-making skills; relating science learning to personal goals and career awareness; and extensive use of laboratory-oriented activities, field studies, and informal educational environments (Bybee et al., 1990). An examination of the service learning student outcomes outlined above suggests that service learning may well be one means to achieving true middle level science curricular and instructional objectives.

Service learning is not only a means for closing the gap between middle school philosophy and middle-level science curriculum and instruction, it also functions as a means to achieving several of the science standards proposed by the National Research Council (1996) in its document, *National Science Education Standards*. While the document does not make direct reference to service learning, it may clearly be perceived as a means to achieve some of the science standards. A couple of examples help demonstrate this relationship.

Science Teaching Standard D states that teachers of science need to design and manage learning environments that provide students with the time, space, and resources needed for learning science. In doing this, teachers identify and use resources outside the school and engage students in the design of the learning environment (NRC, 1996). Service learning supports the achievement of this standard by (a) seeking to connect schools and communities in new and positive ways and (b) involving students in the planning of each service learning experience.

Science Content Standard 7 states that an important purpose of science education is to give students the means to understand and act on personal and social issues (NRC, 1996). Service learning programs seek to engage students not only in learning about social problems but in doing something about them.

“Salven El Desierto” (Save The Desert) is a science-based service learning project located at Valencia Middle School in Tucson, Arizona. A 1994 National Science Foundation service learning project school, Valencia developed the unit to link service with the study of desert ecology. Although science is the lead discipline in the unit, math, language arts, and social studies are taught along with and in support of the desert ecology theme. The school is located just outside the Saguaro National Monument and a few miles from the world famous Arizona Sonoran Desert Museum. Prior to participating in the NSF project, a unit on desert ecology and a unit on the history of desert peoples was taught at the school. Both units were taught in traditional ways.

The service enhanced unit, “Salven El Desierto,” continues to provide students at Valencia with an opportunity to examine the ecological aspects and history of the Sonoran Desert. However, with the addition of the service project, students do so in ways that support the fundamental philosophy of middle school learning and meet the goals of several national science content standards. Through an arrangement with the Arizona Sonoran Desert Museum, Valencia students serve as junior docents with the museum. Along with their classroom studies on the desert environment and history, students receive additional instruction from the museum’s educational staff. Following the training the Valencia students don museum uniforms and, as a service learning project, work alongside adult volunteers to provide information on the desert to the thousands of visitors who come to the museum each year.

The service component of “Salven El Desierto” does much to align the curriculum and instruction at Valencia Middle School with the goals of middle school science and middle school standards. By way of the project, students apply what they learn in the classroom to real life issues and problems. In their role as junior docents, students utilize field studies and informal educational environments to refine personal and social decision-making skills and examine personal goals and career possibilities. “Salven El Desierto” provides a unique connection between the school and community, and actively engages students not only in learning about issues and problems but in doing something about them.

Middle School Social Studies and Service

Like their science colleagues, middle school social studies teachers are faced with making curriculum and instructional decisions that reflect and support middle school philosophy and structure. They are also confronted with national, state, and local program standards. In 1994 the National Council for the Social Studies published *Curriculum Standards for the Social Studies: Expectations of Excellence*. At the same time, standards were being developed in history, geography, civics and government, and economics. The social studies standards were designed to address overall curriculum design and comprehensive student expectations, while the individual discipline standards were to provide focused and enhanced content detail.

As is true in the case of the science standards, service learning is not directly referenced in the social studies standards. However, many service learning outcomes are represented in the social studies standards, either in support of or as a means to achieving specific standards. For example, the National Council for the Social Studies theme of individual development and identity calls for social studies programs to include experiences that enable the learner to describe personal connections to places associated with community, nation, and world (NCSS, 1994). In similar terms, service learning programs seek to help students become invested in their communities by working with community groups or agencies to improve community life.

Within the theme of individuals, groups, and institutions, NCSS suggests that social studies programs include experiences that provide for the study of interactions among individuals, groups, and institutions so that learners can apply knowledge of how groups and institutions work to meet individual needs and provide for the common good (NCSS, 1994). Service learning programs seek to help students develop a greater sense of commitment beyond self, a broad base of experience and community connections, and a sense of membership in the community.

Under the theme, civic ideals and practices, NCSS recommends that social studies programs include experiences that provide for the study of the ideals, principles, and practices in a democratic

republic so that the learner can (a) practice forms of civic discussion and participation consistent with the idea of citizenship in a democratic republic and (b) examine standards designed to strengthen the "common good" through a range of options for citizen action (NCSS, 1994). Service learning stresses students' involvement in their communities through service activities. The process of looking at community problems and considering solutions involves students in civic discussions that produce plans of action. Further, service learning contributes to community development and revival. As young people contribute through service to the common good, they are seen to be one of the community's greatest resources.

Mansfeld Middle School is an inner-city school located in Tucson, Arizona. In 1993, the school participated in the NSF service learning project and developed the service learning enhanced project, "The Kid's Guide To Hunger." This social studies-based unit involves students in the study of food and hunger problems throughout the world. Food and hunger issues had been integral to the curriculum. However, prior to Mansfeld's participation in the NSF project, there had been little integration with other subject areas and of course no service linkages.

Like schools throughout the nation, prior to the Thanksgiving holiday, Mansfeld Middle School participated in a yearly community food drive. Traditionally, the school collected the least amount of food of any middle school in the district. Students involved in "The Kid's Guide to Hunger" decided that their service project would involve educating their peers about food and hunger issues in the community of Tucson in hopes of effecting a change in the giving patterns of the other students.

Along with their integrated studies on global food and hunger issues, students designed a hunger awareness campaign. Primary in their effort was the development of a videotape on which they explained the function of the local food bank and featured interviews with food bank officials, workers, and recipients. After the video was edited, students took it to each homeroom class in the school and showed the film, answered questions, and made a plea for food for the Mansfeld food drive. Mansfeld gathered more food than any other middle school in the district in 1994.

"The Kid's Guide to Hunger" project illustrates the relationship between service learning and some of the social studies content standards. Specifically, "The Kid's Guide To Hunger" provided students an opportunity to achieve the social studies content objectives of making personal connections in the community; understanding how groups and institutions meet individual needs and provide for the common good; and studying the ideals, principles, and practices of a democratic republic. Additionally, the project accomplished these objectives in a manner consistent with true middle school philosophy and goals.

National Science Foundation Project

Mindful of the harmonious relationship between middle-level education and service learning as well as the need to enhance middle-level science and social studies curriculum and instruction, the Social Science Education Consortium (SSEC) developed and was awarded a 3-year teacher enhancement grant by the National Science Foundation to work with middle school teachers to augment their curriculums with service learning. The project, "Enhancing the Middle School Curriculum Through Community Service," brought together teams of middle school science and social studies teachers from Colorado, New Mexico, and Arizona for month-long summer institutes in 1993 and 1994. Life science and social studies comprised the focus of the 1993 summer institute, while the 1994 institute stressed earth science and social studies. Whereas the Social Science Education Consortium was responsible for the social studies content and teacher strategies, the science content and instruction were coordinated by the University of Colorado's Science Discovery Program. Science Discovery provides science instruction for children and teacher training at elementary and middle schools.

Each of the two summer institutes was designed to (a) introduce participants to the nature and scope of service learning, (b) provide an opportunity for participants to examine and develop interdisciplinary curricular linkages, and (c) help each team create a model unit. Each of the model units developed during the institutes integrated science (the primary content area) and social studies topics with service activities. Several units also

integrated language arts, math, and other subject areas or disciplines.

Following the institute, each team was responsible for teaching and evaluating the model units in their classrooms. Themes of the units were diverse, focusing on concepts covered in life and earth science in the science curriculum and geography, history, and civics in social studies. As can be determined from the descriptions provided above, the service projects were also varied. Service activities ranged from the building and installing of the bat houses to the design and development of low-maintenance community native plant gardens. Additional examples of model units developed during the institutes include the following:

- “*Signs Along the Trail.*” This science/social studies unit involves students in learning about rivers, human settlement, and river ecosystems. Students design, construct, and place flora and fauna identification signs along the Arkansas River Trail in Pueblo, Colorado.
- “*Land of Plenty?*” This unit focuses on the limited nature of earth’s resources and uses the theme to integrate the core subjects. Topics addressed include definition of and availability of resources and human resource wants and needs. Service projects include on-campus recycling and conservation activities at schools in Mesa, Arizona.
- “*Treasured Trees of Mescalero.*” This unit integrates all academic areas around the community’s respect for and uses of trees. The service project involves students working with tribal elders to construct park benches out of downed timber and locating the benches throughout the Mescalero Apache community in New Mexico.
- “*Trails to Colorado: Past and Present.*” The unit integrates all academic subjects in the study of the impact of human settlement and economic development on the environment. Service activities include educating the community about local environmental problems related to economic development as well as educating the community about those private sector enterprises that are environmentally responsible in Commerce City, Colorado.
- “*A Taste of Hominy.*” In this integrated science and social studies unit, students examine how Native American cultures of the southwest use and impact natural resources. Service projects include working with neighborhood volunteers to develop native and non-native gardens on school property at Sunnyslope School in Phoenix, Arizona.

In addition to implementing their units, each participating team conducted at least one awareness workshop for teachers in their school or school district. Several teams also conducted workshops

at local, regional, and national conferences. Staff provided follow-up training and technical assistance, often worked with the teams in their awareness workshops, and made a minimum of two site visits to each of the team sites.

A resource book, *Service Learning in the Middle School Curriculum* (Schukar et al., 1996), was developed as the final NSF project activity. The book, published and available through the SSEC, provides an overview of service learning, a detailed description of the curriculum and planning framework, synthesized versions of six of the model units developed during the course of the project, and a section on assessing integrated service learning projects.

Teacher Impact Assessment

Following the implementation of model units by the Year Two project teachers, the SSEC staff, with assistance from four service learning evaluation experts, designed a teacher impact evaluation protocol to determine the effects of participation in the SSEC service learning teacher enhancement project on (a) teacher instruction, (b) collaboration with colleagues and the community, and (c) perceptions of service learning and its effects on student learning. Of the 80 teachers involved in the project, 55 were interviewed by telephone or in person during April, May, and June 1995. Table 1 summarizes some of the data collected and made available to the National Science Foundation.

Table 1
Participant Data

1. Participants who chose to attend the institutes because of an interest in the topic:	78.6%
2. Participants who indicated that service was a priority	
• in their schools:	70.4%
• in their school districts:	61.1%
3. Participants who had no previous experience with service learning prior to the institutes:	66.7%
4. Participants who implemented a service learning project in their school following participation in the institutes:	79%

Some of the benefits of the integrated science/social studies/service learning approach found by teachers included:

- Enhanced student interest in, understanding of, and attitudes toward both science and social studies.
- Strengthened community and school ties.
- Positive impact on personal philosophy of instruction and feelings of professionalism.
- Improved collaboration with colleagues and community resources.
- Expanded view of the role of students in the community.

Teachers rated the impact of student participation in the service learning project on student interest in science and social studies, student understanding of science and social studies concepts, and student attitudes toward the two content areas. Table 2 summarizes the teachers' responses.

Teachers were asked to rate how valuable students felt the service learning project was to them personally, academically, and to the community. On a scale of 1 (low) to 5 (high), teachers rated how students valued the project as follows: personally—mean 4.3; academically—mean 3.9; to the community—mean 4.1

Asked to describe the greatest strengths of their integrated science/social studies service learning units, the teacher participants noted the following: (a) the hands-on learning experience afforded by the project, (b) students' connection with the larger community, (c) teachers' enhanced ability to integrate across academic disciplines, and (d) the unit topic's relevance to students. Of teachers who implemented units, 87.5 percent reported they would teach their units again. Many reported they would begin their unit earlier in the year, include more resource people, and work more closely with other team members when they teach it again.

When asked to describe their greatest satisfaction with implementing their integrated service learning units, teachers reported a wide range of positive outcomes, both for themselves and for students. The most commonly reported satisfactions with the unit are summarized in Table 3.

Conclusion

Service learning enhanced curriculum and instruction in middle schools helps bridge the gap between the theory and practice of middle level education. At the same time, the relationships between service learning and student achievement of content standards make service learning an important link in the current educational reform move-

Table 2
Impact of service learning project on student interest in, understanding of, and attitudes toward content areas.

Scale: 1 (low) to 5 (high)

	Mean
Interest in science	3.9
Interest in social studies	3.8
Understanding of science concepts	3.8
Understanding of social studies concepts	3.9
Attitudes toward science	4.0
Attitudes toward social studies	3.9

Table 3
Most Commonly Reported Teacher Satisfactions With the Project

- Student enthusiasm and excitement about the unit. Teachers reported that students were highly involved in the unit and felt a sense of accomplishment as a result of the unit.
- Providing an authentic learning experience for students. Teachers reported a high level of student interest in science content through the unit's hands-on approach; teachers reported that students felt they did something worthwhile in the community; teachers expressed satisfaction with having created this "real" learning portion of the unit.
- Low-achieving students and "troublemakers" got excited about the project, enjoyed the unit, and did especially well in the service learning portion of the unit.
- Students expressed a sense of pride about themselves and their achievements through participation in the unit.
- Teachers reported a feeling of mastery and achievement as a result of creating and implementing a successful integrated unit.
- The school and students received public recognition for undertaking a worthwhile project in the community.

ment. However, the most important benefits of service learning are found in its direct, day-to-day impact on students, communities, and schools. It is the doing, caring, helping, and linking that occurs within a service enhanced curriculum that is primary.

Service learning provides educators with a means to respond to the harsh logic of events that shape the lives of their students and to offer students opportunities to make positive contributions to their communities. Patti Werner, one of the teacher designers of the Sand Creek Park project at North

Middle School, summed up her experience with service learning by noting the following:

Throughout the year, as the service learning project progressed, I heard comments from students about their “new found” interest in the community. They found new strengths within themselves and others and realized that they can make a difference in the community. (Schukar et al., 1996, pp. 99)

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TIP