What are Students Learning?: Assessing Service Learning and the Curriculum

Kathryn Blash Cumbo
University of Colorado Boulder

Jennifer A. Vadeboncoeur
Montana State University - Bozeman

Follow this and additional works at: http://digitalcommons.unomaha.edu/slceslgen

Part of the Curriculum and Instruction Commons, and the Service Learning Commons

Recommended Citation
http://digitalcommons.unomaha.edu/slceslgen/32
What Are Students Learning?: Assessing Service Learning and the Curriculum

Kathryn Blash Cumbo
University of Colorado - Boulder
School of Education, CB 249
Boulder, CO 80309
Kathryn.Cumbo@Colorado.edu

Jennifer A. Vadeboncoeur
Montana State University
Dept. of Education, 120 Reid Hall
Bozeman, MT 59717
vadebonc@gemini.oscs.montana.edu

What Are Students Learning?: Assessing Service Learning and the Curriculum

Kathryn Blash Cumbo
University of Colorado - Boulder

Jennifer A. Vadeboncoeur
Montana State University

Introduction

Service learning, a method of learning and teaching, has the potential to move our educational system into the 21st century by providing a vehicle for integrating the needs of schools and communities while reflecting current reform agendas and providing meaningful learning experiences for students. In order for service learning to play a role in the transformation of our schools, however, educators must become successful at linking service to learning — making connections between service experiences and academic learning explicit. This paper explores the meaning of learning in service learning by explicating: a) how service learning links to current standards based reform agendas and; b) how the academic learning associated with service learning can be assessed by teachers, professors, and community agency personnel.

With the sheer number of educational reform initiatives introduced into our educational system, many educators are feeling "bombarded" and overwhelmed (Goodlad, 1990; Howey, 1995), with most viewing initiatives such as content standards, authentic assessment and service learning as "add-ons to everything we are already doing." Educators are feeling pressured to address district content standards, develop and employ a variety of assessment techniques, and embrace reform initiatives that may only last until new reform movements become vogue. Ultimately, strategies must be designed and implemented for unifying reform initiatives and clarifying not only the content and curriculum, but also the methods for instruction and assessment.

The purpose of this paper is to develop an argument for the use of service learning as a vehicle for integrating various reform initiatives into a seamless educational system — a system of learning, teaching, and assessment that embraces democratic ideals, addresses real-world issues, evaluates learning and teaching in authentic ways, and is based on high academic standards. This paper is divided into four sections. The first section provides a brief overview of service learning, standards based educational reform, and authentic assessment. The second section presents the method of inquiry employed to develop a model for integrating the various reform initiatives using service
learning as the foundation — including the role of the people with whom we collaborated in the development of the model. The third section describes a case study project that explicates the integration of service learning, standards based education, and authentic assessment at an elementary school. The case study is followed by a general model for designing and assessing service learning projects. Finally, the fourth section includes a summary of our work and several educational implications.

**Laying the Foundation: What Do These Terms Mean?**

This section explores the research and theory connected to three trends in education today: service learning, standards based education, and authentic assessment. Although educators are expected to incorporate aspects of these reform movements into their daily pedagogical practices, they are provided with few resources and strategies for how the initiatives are connected to one another — or to educators’ existing practices. A platform or foundation is needed to unify the new approaches to education in a comprehensible fashion; we propose that service learning could play the role of synthesizing the many and varied reforms into a coherent approach. In addition, many of the “current reform initiatives, including the setting of standards, aspire to very ambitious achievement for students. These results are not likely to be achieved with textbook-bound or recitation-style teaching. ... service learning can be an aid in making the abstract concrete for students struggling to understand complex concepts” (Carter, 1997, p. 71). This section provides an overview of service learning, standards based education, and authentic assessment with the goal of forming connections across the three initiatives.

**Service learning.** Service learning is commonly defined as a method in which students learn experientially and actively through participation in meaningful service that meets actual community needs and is linked to the academic curriculum. It enables students to apply academic knowledge and skills to real needs identified by the community. Service learning can be implemented in various ways, ranging from “add-ons” to the existing curriculum in the form of after school projects, to a teaching and learning tool incorporating classroom curriculum, to a philosophy that guides a teacher’s, school’s, district’s or community’s educational practices. Hence, service learning is an instructional strategy, a learning method, and an educational philosophy.
Defined by the Commission on National and Community Service through two acts on service
learning in 1990 and 1993, and noted in Kraft and Krug (1994), a service learning program provides
educational experiences:

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 calibration with school and community;

b. That is integrated into the students’ academic curriculum or provides structured
time for a student to think, talk, or write about what the student did and saw during
the actual service activity;

c. That provides a student with opportunities to use newly-acquired skills and
knowledge in real-life situations in their own communities; and

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 (p. 199).

Service learning is about meeting real community needs, having structured reflection time to make
connections between curriculum and service, having the opportunity to use the skills acquired-in an
authentic setting, and developing a sense of self which includes sharing with, caring with, and acting
in the world.

In addition, Kendall (1990) provides a complementary definition for service learning
programs. She notes that service learning programs emphasize accomplishing “tasks which meet
human needs in combination with conscious educational growth” (p. 20). The tasks in the community
are connected with intentional goals, conscious reflection, and critical analysis. Combining the
definition from the Commission on National and Community Service with the definition from Kendall
(1990) strengthens the importance of reflection and critical examination of social issues and the ways
in which inequities may be institutionalized.

According to Kendall (1990), there are two factors that separate service learning programs
from other forms of community service and volunteerism. First, service learning programs explicitly
include components which facilitate learning the social issues behind the needs they are serving.
Understanding the historical, sociological, political, and cultural context within which the need or
issue surfaces is of crucial importance. Service learning, if thoughtfully constructed, helps the
students involved see the examination of and reflection on their service activities as part of a larger
context; a context of social justice, social policy, and social responsibility — rather than an as an act of charity (Kendall, 1990).

The second factor that distinguishes service learning from other forms of community service and volunteerism is an emphasis on reciprocity. For Kendall (1990), reciprocity is the balanced exchange between the service provider, or the student, and the service organization and its clients. It is the act of giving and receiving at the same time such that both parties in the service relationship teach each other and learn from each other. In this way the paternalistic approach of traditional “service” interactions — between service providers who are sharing their resources and service recipients “in need” — is avoided. In service learning this relationship is replaced by respect and a collaborative approach to the construction of projects and activities. Indeed, while the service providers have resources to share, those being served control the identification and the determination of what the service tasks will be. Together, “service partners” inquire into the social conditions that initially led to the unmet need given the particular community membership and local setting.

In its most common forms, service learning involves community based problem-solving focused on issues identified by community members and students. For instance, when students work to reclaim the wetland behind their school, tutor younger Spanish speaking students in literacy skills, or rebuild bicycles for Navajo children, they learn and utilize a wide range of skills and knowledge (Timmons & Cumbo, 1995). Service learning motivates students to learn new skills or content area knowledge because they are applied to relevant social issues which the students consider real and important. For example, quality writing is recognized as essential when proposals for funding, public service announcements, letters to the editor, and educational materials are produced from specific projects. Precise measurements and calculations take on new meaning when designing a nature trail, building a playground, or taking water samples to measure pollution levels. Service learning is collaborative and it demands strong interpersonal and problem-solving skills to address real issues. An essential component of service learning is structured written and verbal reflection which challenges students to think about their experiences, as well as the curriculum, in new ways (Timmons & Cumbo, 1995).
There are two central issues that must be addressed for service learning to be utilized to its fullest potential—both involve learning. First, clear academic standards must be represented in service learning activities and assessments. In other words, content standards must be considered during the planning, implementation and evaluation phases of service learning projects. Second, assessments must be developed that reflect those content standards, as well as the rich, dynamic, and complex nature of learning associated with service learning projects. The following two sections provide an overview of standards based education and authentic assessment.

Standards Based Education. On the national level, the standards based education reform initiative is aimed at providing educators, parents, students, and others with specific information about how well students are doing at meeting commonly held standards of student performance. To meet this goal, each state adopted a set of content standards and legislated two different levels of testing—state (4th, 8th, and 11th grade) and local—to provide different types of information. For example, in the state of Colorado House Bill HB 93-1313 provided a directive that student assessment must be aligned with the content standards and must accurately measure what students have learned and are able to do—with schools and districts having the authority to design the tests to be used at the local level.

In Colorado and the other states, statewide standards were translated into curriculum frameworks by districts and schools. For example, a statewide standard for writing is: “Students write effectively for a variety of purposes and audiences.” Benchmarks are then identified by schools for grade levels. For students in grades 9 - 12, a sample of writing benchmarks may be articulated as follows: As students improve the quality of their writing they will: a) plan using a variety of strategies; b) develop a thesis of theme; use order, support, transition, logic, audience awareness, voice; c) gather, record, organize, integrate information; and d) use complex sentences, paragraphs, overall structure. There is an inherent tendency in standards based education to reduce content to particular facts and skills to specific applications. It is difficult not to end up with discrete and isolated bits of information that appears rather empty and bland to both students and teachers. As a foundation, however, “service learning supports and enriches these frameworks by providing opportunities for students to apply the concepts” and actually reflect on the application of concepts.
to real world problems enhancing the academic content and making it meaningful (Carter, 1997, p. 70).

Standards based education requires a clear and comprehensive measurement system in place for ongoing evaluation and assessment. Standards become meaningful only if there are assessments that tell how well students and schools are meeting the standards. Developing a sound assessment system — one that provides information to both educators and the public about what is working — is the key to making this school reform effort a success (Colorado Department of Education, 1996).

**Authentic Assessment.** It is now widely accepted that multiple-choice, norm-referenced "traditional" tests fail to measure many important dimensions of learning and do not adequately promote effective teaching (Madaus & Kellaghan, 1993; Wiggins, 1989). As a result, educators are pushing for the development and use of alternative assessments — "approaches that look directly at students' work and performances in ways that evaluate what they understand and can do, as well as how they think and learn" (Falk, 1994, p. 30). This type of assessment is congruent with a kind of education that prepares students to "frame problems, find information, evaluate alternatives, create ideas and products, and invent new answers to messy dilemmas" (Darling-Hammond, 1994) — many skills which are articulated by content standards as well. Alternative assessments are "authentic" in that they engage students in real-world tasks that occur in real-life contexts (Falk, 1994). And they may also be "performance assessments," which require students to demonstrate their competencies or knowledge by creating products or solutions (Feuer & Fulton, 1993). These assessments are believed to assist teachers, schools, and school systems to better understand what students know and can do with the goal of improving instruction and educational practices (Engel, 1994). This type of assessment relies heavily on teachers' observation and judgment of student performance (Stiggins, 1987), hence the need for accurate and explicit methods of assessment.

Performance assessment is commonly the mode of assessment used to evaluate what students learn from service learning activities. For example, teachers observe how students work together to as they build a playground, perhaps taking notes on students' progress in cooperation and problem-

---

1 We prefer the term "authentic" assessment over "alternative" assessment because we feel the latter positions this type of assessment in opposition to the mainstream — or more standardized assessments — inevitably placing the authentic assessment movement on the margins of mainstream education.
solving skills. Students' presentation of service learning projects — such as a video production 
describing how the playground was built — offer an event that allows the students to directly 
perform the skills the teacher wants them to learn (i.e., writing skills manifested in the script, 
communication skills, and content knowledge of geometry as the students describe how they 
calculated the amount of sand and lumber to purchase). For a performance assessment — or any 
other form of authentic assessment — to be a valuable tool for teachers to assess service learning, the 
criteria must be made explicit and the evaluation process must be systematically documented by the 
teacher.

**Linking Service Learning, Standards Based Education, and Authentic Assessment**

Service learning provides the foundation for the type of education called for by the authentic 
assessment movement. A primary concern for those designing authentic assessments is the 
development of meaningful tasks to serve as the basis for the assessment (Linn, Baker, & Dunbar, 
1991). In fact, service learning provides the real-world tasks that are the cornerstone of effective 
authentic assessments. As described above, service learning engages students in the application of 
academic content to real-world tasks that occur in real-life contexts. The topic of “choosing a good 
task” which contextualizes the benchmarks of the content standards is a primary component of 
making connections between these reform movements.

To ensure that a task leads to sound assessments, it must: be aligned with a learning outcome; 
pose an enduring problem — the type of problems and situations that students are likely to face 
repeatedly in their future lives; be fair and unbiased (e.g., it does not favor one group of students over 
another because of cultural heritage, economic status, or gender); be credible and meaningful to 
important constituencies including students, parents, teachers (and here we add community 
members); and be feasible to accomplish within the confines of space and time afforded by schools 
(Herman, Aschbacher & Winter, 1992). Overall, authentic tasks should involve real problems, 
situations, and audiences (Linn et al., 1991). Generating meaningful, real-world tasks may prove to 
be a formidable challenge for teachers and educators implementing authentic assessments. However, 
for teachers and students engaged in service learning, this problem is ameliorated given the many
opportunities that exist for collaboration among community members, teachers, and students (Stiggins, 1997).

Proponents of the standards based education movement have also developed a set of criteria for developing sound standards based assessments (e.g., Standards-Based Education Design Team, 1996; RMC Research Corporation, 1996). These criteria reflect the concerns of the proponents of authentic assessment: that assessments be authentic and address real-world issues and audiences when appropriate, and that they be equitable and unbiased. In addition, like authentic assessments, standards based assessments must be valid and reliable in that they “provide frequent and varied opportunities for students to demonstrate knowledge and skill in order to establish a valid and reliable measure of student’s abilities” (Standards-Based Education Design Team, 1996, p. 4).

In addition, effective standards based assessments are public and accessible in that the scoring criteria for assessments — and model assessments (e.g., from prior years) — are made available to students and parents so that they are aware of what will be expected, and how to improve performance. They also assess skills and knowledge as well as higher order thinking skills and complex cognitive processes such as “hypothesizing” and “synthesizing.” Standards based assessments are also collaborative in that they should be developed in cooperation with colleagues through a process of mutual support and critique which, in turn, increases the validity of assessments (Standards-Based Education Design Team, 1996). Another common feature of both authentic and standards based assessment is the application of learning assuring that students can apply and transfer what they learned in one situation to new problems and contexts (Stiggins, 1997).

The principles of sound assessment — whether authentic or standards based (or both) — align with principles of good practice for service learning — which call for real-world problem solving, authentic learning opportunities and audiences, and active student participation in all phases of the project — as well as give direction to educators struggling with designing authentic, standards based assessments for their service learning projects. Integrating authentic, standards based assessment

---

2 The extent to which an assessment measures what it is supposed to measure (e.g., the extent to which it measures performance levels associated with a particular content standards). A valid assessment allows students demonstrate what they know, but does not let them pretend to know.

3 The extent to which the results of an assessment are consistent over time (if students were measured repeatedly over time with similar assessments) and across different groups of students.
Practices into service learning projects may thus take the form of having students participate in the development of assessment tasks and scoring rubrics which increases student “buy-in” and participation in the educational process.

**Method of Inquiry**

Over the course of our activities as state evaluators for Colorado Learn and Serve we acted as consultants for several K-12 schools, colleges and universities utilizing service learning. We engaged in inservices with practicing teachers and statewide conferences, workshops, and focus groups for preservice, inservice, and university teachers. Qualitative and ethnographic methods were used to elicit K-16 teachers’ concerns and ideas related to assessing student learning associated with service learning projects. Teachers and university faculty were informally interviewed and field notes and observations were collected during focus groups, then coded and analyzed for themes to develop a theoretical model and scoring rubrics for service learning activities. The model and planning and assessment rubrics were then brought back to the teachers and faculty members and further developed through their feedback. Finally, after making changes to reflect the feedback we received, several participants informally piloted aspects of the rubrics and model in their schools. The information presented in this paper is based on our current model for implementing authentic, standards based assessments for service learning projects — a model developed in partnership with educators throughout our state.

**Service Learning Assessment Model and Rubric**

We found that K-16 teachers attempting to implement service learning programs struggled to integrate service goals with classroom learning goals. Frequent comments were, “I know my students are learning about math, but how can I show what they learned?”, “How can I keep track of what my students are learning at their service sites and how that connects with our curriculum?”, and “I’ve seen my students benefit from service learning experiences, but I have administrators and parents who I am accountable to. So, how can I teach in ways that I know work, and show parents that their kid is learning science?” Issues such as these were the catalyst for the authors to develop a model for thinking about how to assess service and learning goals, as well as rubrics for planning and assessing service learning activities.
The Service Learning Cycle. As mentioned earlier, structured reflection is a crucial component of service learning. Used to guide both verbal and written interactions, reflection is the setting where students, teachers, community members, and/or parents consider what they have achieved, how the process is developing, and whether interactions, relations, or plans need to be reevaluated. In the initial phases of a service learning project, reflection is a method for maintaining open communication and ensuring that all voices are heard in the process. Toward the end of a project, reflection may become a celebration and a method for gaining closure and passing the project on to another group of students and teachers.

Given the importance of structured reflection for learning from personal experience and from the experiences of other people, we used the service learning cycle proposed by Toole and Toole (1993) to ground our assessment rubric. The cycle identifies questions that may be used for general reflection: “what?”, “so what?”, and “now what?.” These questions are markers for phases of learning that connect service experiences and academic content. For example, after a project has been identified and planning and preparation are complete, reflection during the service learning project is guided by two questions: 1) “What?”, as in What are we doing? What are our responsibilities? What is the service? What is being learned? What skills are being applied? and; 2) “So what?”, as in So what does this mean for us as students? So what does this mean for the community members? So what impact are we hoping for? So what should we learn and what should we share with others?

Finally, after the service learning project has been completed, during the post service reflection phase, it is important to spend time considering what is next. “Now what?”, as a reflection question, supports students, teachers, community members, and/or parents in making the next step; considering the impact of the project from all perspectives and making decisions such as whether or not to continue, to renegotiate, to add another component of the project, to focus energy elsewhere, or to examine a new issue. As a method for connecting service experiences with academic course content, this phase allows students to share their new understanding of issues and topics and they can design new projects, even hypothetical ones, which showcase their ability to apply what they have learned.
The service learning cycle is a helpful model for conceptualizing a service learning project, the standards to be met by participation in the project, and the assessment. It reminds us to continually consider the connections between the service and the learning goals of the project and to help our students benefit by making reflection questions explicit.

The Case Study. The following case study is a composite of several service learning projects that took place in Colorado during the 1996-97 academic year. The authors, together with educators throughout the state, brainstormed the elements that would be needed to make existing programs more complete. Through this process, we developed the following case as an example of a model curricular unit that incorporates the best practices of service learning, standards based education, and authentic assessment. We present it here to contextualize our discussion of the development of authentic assessments for service learning (see Figure 1).

Because of recent trends toward organizing education around “essential questions” rather than static bodies of knowledge (Wiggins, 1989), the unit was developed around the question, “How does food affect human existence on a global and local level?” The case study is purposefully general to allow its use as a basis for multigrade projects. Connections may be established within and across elementary, middle and high school students as well as community members and parents. The case study describes possible activities that relate to the topic of food as a global and local commodity: It explores activities in mathematics, science, language arts, civics, history, visual and industrial arts, physical education and music, and foreign languages — areas for which the state of Colorado has developed content standards. The service learning projects that could arise from a unit like this one are endless; the one developed in this case study is a community garden through which students, teachers, parents and community members entered into an educational partnership in order to meet real community needs, explore local issues, and engage in the reciprocal process of teaching and learning.
Figure 1 Case Study: Curricular Unit that Incorporates Service Learning, Content Standards, and Authentic Assessment

Thematic Unit: Food as a Global and Local Commodity

Inquiry Question: "How does food affect human existence on a global and local level?"

Grade Levels: K-12

Number of Students Involved: 400 (one high school, middle school and elementary school)

Description of Unit:

In a small town in Colorado, the students in the elementary school, middle school and high school explored the issue of “food as a global commodity.” In social studies they explored the various types of food grown and eaten around the world. This led to an examination of economic, cultural and political forces that affect the availability and trade of various food crops. In math, the students calculated and graphed these food trends. In science they studied habitats, plant science, and the human digestive system — including how the food grown and eaten in various parts of the world affects the health of its people and its land. This connected to geography in that the students learned to use maps, globes and computers to interpret data on people, places and environments as well as concepts relating to how economic, political and social processes interact to shape and change human populations.

Once examined on a global level, the students investigated how food operated as a commodity in their local community (What types of food were produced locally? How were crops grown locally distributed to local, national and international markets? What were the political and economic issues related to food in their community?). The students visited local farms and distribution warehouses, as well as food cooperatives and soup kitchens. As a result of their investigations, the students identified issues related to the growing, harvesting, distribution and consumption of food within their own community. In order to address the most pressing issue identified — the inequitable distribution of food to indigent peoples, and the inadequate nutrition of these people — the students determined that they would build a community garden behind the elementary school. A portion of the produce grown would be given to the local homeless shelter, the rest would be sold at the local farmers’ market with proceeds going toward maintenance of the garden and distribution of the food.

The garden was a community-wide project with local business donating materials, time, and expertise. Parents and other community members (including folks from the homeless shelter) played an active role in building and maintaining the garden as well as assisting with the selling and distribution of food. Various teaching methods were employed by teachers and community members that included cross-age, cross-community tutoring and collaboration (e.g., high school students presenting information to younger grades as well as to the community at city planning meetings).

Some of the topics and activities related to the “Food as a Global and Local Commodity” unit included:

- **Math:** measuring, calculating, etc. for building the garden; money management; business projections and predictions.
- **Science:** analysis of constituents of local soil and most effective growing practices; use of garden as a “learning laboratory” for investigating hypotheses related to photosynthesis, plant growth, and so forth.
- **Language Arts:** writing letters to procure donations from local business and to voice concerns to legislators about local water laws; writing newspaper articles to document and promote the garden across the community; drafting business proposals; reading literature from a variety of genres relating to food, farming, and so forth.
- **Civics:** exploring principals of democracy and how they affect food issues in the community; functions of local governmental agencies and how water laws impact local food availability.
Using this case study as a model and guide, the remainder of the paper focuses on developing assessments for curricular units such as this one that utilize service learning as a teaching and learning tool. We propose that the process of developing assessments is comprised of three phases. The first phase is the planning phase, the next, the designing phase and the third, the piloting phase.

The Planning Phase. The first step in developing effective assessments for service learning projects is planning. To facilitate the planning process, we have developed a planning rubric. The service learning planning rubric shown in Figure 2 has been completed for the Mesa Community Garden project. Often, service learning projects are assessed in terms of project goals, learning goals (academic and personal), and service goals. These goals are presented in the first column of the rubric. While the focus of this paper is on the assessment of academic learning goals, the rubric illustrates that academic learning is just one component of service learning. Often, however, it is the most neglected aspect when it comes to assessment. The next column presents the articulation of these goals; in order to be assessed, the goals must be specified. The third column represents the forms of assessment that will be employed to evaluate the various goals — including some suggestions for possible academic assessments.
### Figure 1: Planning Rubric for Service Learning Projects

<table>
<thead>
<tr>
<th>Goals</th>
<th>Name of project: Mesa Community Garden</th>
<th>Assessments</th>
</tr>
</thead>
</table>
| **Project Goals** | 1. To build community garden.  
2. To plant and harvest crops.  
3. To donate food to homeless shelter.  
4. To present project to middle school earth science classes. | 1. Completion of garden  
2. Successful harvesting  
3. Delivery of food  
4. Successful Presentation of project |
| **Learning Goals** | 1. (Biology) To understand biological principles and concepts related to botany (as dictated by curriculum guidelines).  
2. (Civics) To understand social issues and governmental policies related to hunger/poverty in this country.  
3. (Language Arts) To learn to write persuasively.  
4. (Mathematics) To demonstrate computational and problem-solving skills, and geometry or algebra, as they relate to the construction of the garden. | Academic Assessments  
1. Research paper by each student that will be compiled into a resource guide for the community accompanied by a presentation by students.  
2. Trace economic, political, and social trends that affect hunger/poverty that will be used to produce video documentary.  
3. Persuasive paper about the impact of local policies on food availability and distribution to be presented to city council.  
4. Mathematics test that asks students to make connections between mathematical concepts learning in classroom with those used to build the garden. |
| **Personal/Non-academic** | 1. Cooperation/teamwork  
2. Basic construction skills  
3. Presentation skills/public speaking  
4. Developing an ethic of service | Assessment of Non-academic Learning  
1. Observation  
2. Completion of garden  
3. Assess presentation  
4. Journals |
| **Service Goals** | (determined jointly by student and teacher)  
1. To learn how to assess needs (and assets) of your community.  
2. To learn how to coordinate service projects.  
3. To learn to communicate effectively with service agencies or recipients.  
4. To learn the importance of providing service to your community and sharing what you have learned with others. | 1. Final paper that asks students to review their service goals and explicate how successful they were at reaching these goals. |
The Designing Phase. Over the course of the 1997-98 academic year we presented this case study and planning rubric to various groups of educators at conferences and workshops. They familiarized themselves with the case study and adapted it for their own schools and students by identifying the standards and assessments that they would most likely be using in their classes. The next step was to design the assessments and rubrics for “Food as a Global and Local Commodity” unit. Based on their feedback, we found that the process of designing standards based authentic assessments required a preliminary stage which they often referred to as “laying the foundation.”

Thus, prior to designing an assessment, decisions about several pieces of information had to be clarified that determined the content and form of the assessment. Using the case study as a model, these pieces of information included: a) the grade level and subject area (e.g., mathematics, science, language arts, etc.) for which the assessment will be developed; b) the particular task related to the community garden (designing, building, harvesting, selling, etc.) that will be the basis of the assessment; c) the academic content that the assessment is to cover and the content standards to be addressed. For purpose of this paper, we will focus on developing a third grade mathematics test for the “building phase” of the project. This example is offered because the subject area (mathematics) and assessment format (test) seem to be the most difficult for educators to apply to service learning projects — especially when it comes to designing assessments that are authentic.

Figure 3, the Service Learning Assessment Rubric, was designed to facilitate the process of developing assessments for service learning projects. Once the planning rubric has been completed (which identifies the content and standards in a general manner), and the foundation has been laid (in terms of selecting a grade level, task, etc.), the next step is to specify in detail what is to be assessed. Thus, while the planning rubric helps educators, students and other participants “get on the same page” about the project and what the goals are, the assessment rubric explicates specifically what is going to be taught and, in turn, assessed. Since service learning projects tend to evolve as they address real community needs and are guided by students’ interests, the assessment rubric will most likely have to be developed as the project progresses.

---

4 For example, the Service Learning and Assessment State Study Group, the Colorado Service Learning Conference, and the Colorado Partnership for Educational Renewal.
The first column of the rubric presents the three components of the service learning cycle “What?,” “So what?,” and “Now what?” (see Figure 3). As such, these reflection components become the central organizing theme for assessments. This is based on the premise that if we want students to learn concrete facts, information, and skills through meaningful experiences (What?), how to make meaning out of their experiences and make connections between content and community issues (So what?), and to be able to apply that knowledge to new contexts and problems as well as take action based on newly developed knowledge and perspectives (Now what?), then it makes sense to assess these aspects of learning as well.

The second column of the assessment rubric presents the content or subject matter that is to be assessed. Since we are focusing on developing a third-grade mathematics assessment for the "building phase" of the garden, the content will include concepts and algorithms related to multiplication, division, and area using whole numbers and percentages, and money sense including addition and subtraction of decimals in the form of money.

The third column of the assessment rubric presents the standards to be addressed by the assessment. In the case of the mathematics test, there are three Colorado Mathematics Standards addressed. The first standard requires that "students develop number sense and use numbers and number relationships in problem-solving situations and communicate the reasoning used in solving these problems." The second standard states that "students use a variety of tools and techniques to measure, apply the results in problem-solving situations, and communicate the reasoning used in solving these problems." And the third standard calls for students to "link concepts and procedures as they develop and use computational techniques, including estimation, mental arithmetic, paper-and-pencil, calculators, and computers, in problem-solving situations and communicate the reasoning used in solving these problems" (Colorado Model Content Standards for Mathematics, 1996).
### Figure 3: Service Learning Assessment Rubric

<table>
<thead>
<tr>
<th>Phases</th>
<th>Content &amp; Processes</th>
<th>Standards Addressed</th>
<th>Instructional Methods</th>
<th>Assessment (what students may be asked to do)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>What?:</strong></td>
<td>Content/Knowledge:&lt;br&gt;• concepts of multiplication, division, and area.</td>
<td>Mathematics Standard #1&lt;br&gt;• Students develop number sense;</td>
<td>lecture</td>
<td>short answer definitions of concepts.</td>
</tr>
<tr>
<td></td>
<td>• number and money sense, decimals.</td>
<td>• use numbers and number relationships in problem solving; and</td>
<td>direct instruction</td>
<td>communicate math concepts with symbols and in writing.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• communicate the reasoning used in solving these problems.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanics/Skills:&lt;br&gt;• how to execute multiplication,</td>
<td>Mathematics Standard #5&lt;br&gt;• Students use a variety of tools and techniques to</td>
<td>presentations</td>
<td>compute perimeter and area of garden</td>
</tr>
<tr>
<td></td>
<td>division, and area algorithms.</td>
<td>measure;</td>
<td>demonstrations</td>
<td>multiply variables related to garden</td>
</tr>
<tr>
<td></td>
<td>• how to use paper-and-pencil and calculator to prepare a budget and</td>
<td>• apply results in problem solving situations; and</td>
<td></td>
<td>compute using percents, and decimals.</td>
</tr>
<tr>
<td></td>
<td>calculate funds.</td>
<td>• communicate the reasoning used in problem solving.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>So What?:</strong></td>
<td>Integration of Knowledge (Synthesis)&lt;br&gt;how to integrate knowledge and</td>
<td>Mathematics Standard #6&lt;br&gt;• Students link concepts and procedures as they</td>
<td>experiments</td>
<td>demonstrate connection between math concepts and procedures</td>
</tr>
<tr>
<td></td>
<td>skills about math learned in the classroom with ways of calculating and</td>
<td>develop and use computational techniques, including estimation, mental</td>
<td>labs</td>
<td>learned in class with those needed to build the garden;</td>
</tr>
<tr>
<td></td>
<td>problem solving at the garden.</td>
<td>arithmetic, paper-and-pencil, calculators, and computers, in problem solving</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>situations and communicate the reasoning used.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Now What?:</strong></td>
<td>Application of Knowledge (Transfer)&lt;br&gt;how to apply new “integrated”</td>
<td>Although not explicitly discussed in terms of “transfer” or “application” of</td>
<td>service learning</td>
<td>demonstrates ability to make plan of action with knowledge</td>
</tr>
<tr>
<td></td>
<td>knowledge to the actual building of the garden and management of project funds.</td>
<td>knowledge, the standards listed above focus on problem solving which facilitates</td>
<td></td>
<td>(e.g., can decide how much fence to buy).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the transfer and application of knowledge.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Since instruction and assessments should be integrally linked in a standards based classroom (Standards Based Education Design Team, 1996), the fourth column of the assessment rubric presents possible instructional methods and activities that might be employed to ensure that the content and standards are covered prior to being assessed. As with the content and standards, the teaching and learning methods also can be organized around the concepts of "what?", "so what?", and "now what?". In the case of the third grade mathematics test, to address the "what?" of students learning, possible teaching and learning methods include lecture and direct instruction (e.g., teacher instructs students on concepts and procedures involved in calculating area) and presentations and demonstrations (e.g., local carpenter instructs students on how to measure and cut lumber). In terms of the "so what?" or integration of student learning, possible instructional methods include experiments and labs (e.g., students calculate growth rate of various plants and chart them, then determine which plants to plant when). Service learning is an effective method for helping students ask "now what?" and learning to take action with their knowledge (e.g., students determine need in the community and brainstorm solutions, one being the distribution of the food grown to a local homeless shelter and the other being a financial feasibility budget to determine how much money the garden could make).

Although we have presented separate methods to address the "what?", "so what?", and "now what?" of student learning, it should be kept in mind that every instructional exercise should ultimately take students through the complete service learning cycle. For example, in group discussions, educators can walk students through describing the "what?" of their experiences in the classroom and at the service site, then ask students to make connections between the knowledge and skills learned in both contexts (so what?), and finally, to apply their knowledge to new problems or situations — or to generate ideas about things they could do to take action with their new knowledge. The bottom line is that if we value higher order thinking skills, and expect students to be able describe, synthesize, and apply knowledge when being assessed, then these processes must be explicitly modeled and practiced by students in educational contexts in and out of school.

We spoke with a kindergarten teacher, who, after participating in one of our workshops, began asking his students "what?" "so what?" and "now what?" after they engaged in lessons and activities.
We spoke with a kindergarten teacher, who, after participating in one of our workshops, began asking his students "what?" "so what?" and "now what?" after they engaged in lessons and activities. As a result, a trip to the local planetarium led to the children designing a model planetarium in their classroom for children in a neighboring preschool — a project driven by the kindergartners' concern that although the planetarium was "cool" and they learned a lot, it was a "scary" place because of the darkness and loud sound effects. By building a model of the planetarium in their classroom, they were able to show the younger children "all the cool stars and stuff" without the intimidating environment. The teacher of this class of kindergartners takes them through the service learning cycle on a regular basis and as a result, claims that these children are no longer satisfied just to "know" — they must "do." As exemplified by this group of kindergartners, even young children are capable of learning in ways that far exceed the concrete knowledge and skills often promoted in schools — and it is achieved when instruction and assessment are organized by the service learning cycle.

The fifth column of the assessment rubric corresponds to the actual designing the assessment. This process is the most labor intensive and is best accomplished if approached as a collaborative endeavor among a team of educators, community or business personal involved in the project; and sometimes the students can help as well. For example, if there are aspects of the plant growth cycle about which the master gardener is more knowledgeable, why not have him / her offer suggestions about content to cover in the assessment — information that he or she may have taught the students. This takes time and coordination among diverse constituents. However, local business, community members, parents and students — as well as the teachers — have a stake in the education process. The other piece of advice that we received about designing assessments for service learning is that there is no need to “reinvent the wheel”: A growing corpus of sound authentic and standards based assessments are available from local districts and state departments of education,5 many of which could be easily adapted to fit projects such as the Mesa Community Garden.

5 For example, in Colorado there is a Standards and Assessment Resource Bank available from the Resource Center, Colorado Department of Education, 201 E. Colfax Ave., Room 106, Denver, CO 80203, (303) 866-6618.
Returning to the example of a third grade mathematics test, this fifth column would include information about the types of questions that would best get at the content, skill and standards we want to assess. Tests typically include multiple choice questions, fill-in-the-blanks, short answer, concept maps, and so forth. In an attempt to not “reinvent the wheel,” we asked third grade teachers to help us think about the ways that they traditionally assess the concepts such as perimeter, area, and money sense. Most indicated that for these skills, they rely on chapter tests out of their text books. By adapting questions from chapter tests to fit the context of the Mesa Community Garden — the “building phase” in particular — we developed the following third grade mathematics assessment (see Figure 4).

Figure 4 Community Garden Activity & Elementary Mathematics Assessment

The third grade at Peak Elementary School has decided to build a community garden behind the playground. They plan to sell some of the produce to raise money for future projects and donate the rest of what they grow to the local homeless shelter. They decide that the first step is to write a proposal describing their plan including the activities and money that it will require. These are the activities that the students think will be necessary:

Activity One: Build the garden and get the soil ready for planting
Activity Two: Buy and plant the seeds
Activity Three: Water and take care of the garden and harvest the plants
Activity Four: Sell some of the food at the local Farmers’ Market and get rest of the food to the homeless shelter.

The assessment that follows corresponds to Activity One — Building the garden and preparing the soil.
Community Garden Project
Activity One: Building the garden and preparing the soil

Task #1: Making the Perimeter of The Garden
1.1 The local lumber store has donated a piece of wood that is 40 feet long. If the garden is to be square, what is the largest square that can be made from this piece of wood cut into 4 boards? Draw and explain your answer for your classmates.

Task #2: Keeping the Critters Out!
2.1 Next, a fence will be needed around the outside of the garden to keep out raccoons and deer. The first step will be to figure out what the perimeter of the garden will be. Then think about how many feet of fence needs to be bought (show your work).
   a) What is the perimeter of the garden?: ____________________
   b) How much fence is needed?: ____________________

2.2 a) The class has agreed to buy fencing that is $3.00/foot. How much money will it cost to fence in the garden? What is your best guess? ______________
   b) Now figure out how much the fence will cost and see how close your guess was. Be sure to show your work so you can explain what you did to your classmates.

Task #3: Getting the Soil Ready
3.1 Once the garden is built, the next step will be to get the soil ready. The class' research papers told us that we will need to add mulch to the garden to help the plants grow.
   a) How could you figure out how much mulch is needed if we need to fill the entire area of the garden inside the fence?
   b) Is there any other way you could figure it out?
   c) What is the area of the garden? (show your work): ______________

3.2 If one bag of mulch is needed for every square foot of the ground in the garden, how many bags would we need to buy? (show your work): ____________________
3.3 The local nursery has agreed to sell the mulch to the class at 50% off the regular price. If each bag is regularly $8.00 a bag, how much money will the class need to spend on mulch for the garden? (show your work): ___________________

Explain what you did to figure out the cost: ___________________

Task #4: Keeping Track of the Cash

4.1 Now the garden is ready for planting. Before the class can go out and buy the seeds you need to figure out how much money the class has spent and how much is left over to spend on seeds. The class raised $234.78 by doing a “Pet Wash” and $321.60 from bake sales. What is the class’ total budget? ___________________

4.2 a) How much has the class spent so far? ___________________
   b) How did you figure out how much has been spent? ___________________

   c) Is there another way you could figure it out? ___________________

4.3 a) How much money does the class have left over to buy seeds with? ___________________
   b) How do you know your answer is right? ___________________

This mathematics test is an example of a standards based authentic assessment of service learning. It includes the qualities deemed essential by the standards, authentic assessment, and service learning movements: it involves real-world problem solving as the children struggle to determine the measurements and costs of their community garden; it provides an authentic learning opportunity and audiences, in that the student’s calculations and estimates will be utilized in the building of the garden; and it promotes active student participation by allowing the students to take a lead in conceptualizing and problem solving issues related to the garden.

Piloting the Assessment: Additional assessment issue to consider. There are more issues than these, however, that must be addressed to ensure an equitable, reliable and valid measure of student learning. First, accommodations need to be considered for special needs students. In other words, educators need to ask how the problems in this assessment could be altered to address their students’ abilities — as well as cultural and gender issues. Second, the
test would need to piloted on a group of students or at least reviewed by colleagues to ensure that it actually measures what it is intended to measure — a process that increases the validity of the assessment. Third, the assessment needs to piloted on different groups of students to ensure that is generalizable to other populations of children — an issue that relates not only to its reliability, but also to its equity. Fourth, because this assessment is part of a holistic unit with the purpose of exploring the question, "How does food affect human existence on a global and local level?", the assessment must be linked to other content areas related to the unit as well as to the question it is intended to help answer. Thus, just as the students' learning cycles from "what?" to "so what?" to "now what?" and back to "what?" again, so too do service learning projects cycle back to the questions that initiate them — both processes being facilitated by the assessments employed.

Summary and Educational Implications

Research on service learning spanning the last three decades has focused on the development of social and emotional skills and abilities at the expense of assessing academic content and cognitive skills associated with service learning experiences (Kraft & Swadener, 1994). Hence, we have a great deal of information about the development of leadership skills, self-esteem, team work, and communication skills in students participating in service learning projects (Shumer & Belbas, 1996). The current reform initiatives (e.g., State Content Standards and the Alternative Assessment movement) however, focus on students' cognitive development with an emphasis on subject matter knowledge, critical thinking skills, and problem-solving abilities. The process of developing assessments for service learning described in this paper speaks to the power of service learning as a vehicle for not only developing responsible, empowered students, but also critical thinkers and problem solvers who are capable of synthesizing and applying content knowledge.

Service learning has proven to be one the most powerful and effective educative experiences that students’ may encounter in and out of school — both in the social and emotional, as well as cognitive domains (Conrad & Hedin, 1989). To realize the full potential of service learning as a learning and teaching tool in the American educational system, we need
to develop effective assessment tools for measuring the academic learning associated with
service learning. The model and rubrics presented in this paper are an important step in this
direction. Given that "both state and district curriculum guidelines (which often feature long
lists of knowledge items and subskills to be 'covered') and typical curriculum packages
supplied by educational publishers (which respond to these state and district guidelines by
emphasizing breadth over depth of coverage) discourage in-depth teaching of limited content,"
(Good & Brophy, 1995, p. 297-298) it is a matter of no small importance for teachers to
consider the ways in which isolated benchmarks may be recontextualized and reflect meaningful
content rather than discrete knowledge items. For many of the teachers with whom we worked,
time to design service learning projects, to create assessments, and to collaborate with
colleagues and community members was the primary factor limiting their use of service learning
and authentic assessment in their classrooms. It is our hope that, through continued
collaboration, we will be able to offer teachers theory and practice based ideas for integrating
current reforms.
References


