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The call for papers and a set of guidelines can be found in the back of this issue. A one-page abstract or précis is due December 15, 2000. Invitations will then be extended to submit a complete manuscript, to be due March 23, 2001. Papers will be peer-reviewed. If you have any questions contact the Editor [734-647-7402 (phone); 734-647-7464 (fax); or by e-mail: jphoward@umich.edu].

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What Do We Most Need to Know About the Impact of Service-Learning on Student Learning?

Janet S. Eyler
Vanderbilt University

Survey research over the past decade gives us ample evidence of the impact of service-learning on the personal and social development of college students; the evidence for its cognitive impact is less well developed. In order to improve the quality of academic service learning, we need to move beyond surveys and identify the intellectual outcomes best facilitated through service-learning, create measures of those learning outcomes that can be embedded into the instructional process, and conduct experimental studies of alternative pedagogical techniques to identify those which produce optimal learning and cognitive development.

There has been a flood of service-learning research in the 1990s and most studies have focused on the impact of service-learning programs on students. Unfortunately, this research is weakest in both concept and methodology precisely in the areas where we need the most guidance if we are to design powerful academic programs. We know that service has something important to contribute to personal and social development; we have less reason to be confident that using it with academic learning is a force for intellectual outcomes — knowledge, cognitive development, problem-solving skills, and transfer of learning — are at the heart of the school and college mission and yet we know relatively little about how they are affected by service-learning. So while we will touch on the many student outcomes documented in the literature, the primary focus of our recommendations for future research will address gaps in our understanding of the academic learning goals of service-learning and the instructional processes needed to achieve these goals.

What We Know

Just in the past ten years there have been several national studies that address the impact of service-learning on students (Astin & Sax, 1998; Eyler, 1992; Sax & Woloshyn, 1995; Sax, 1998; Meek, 1997) and dozens of smaller scale studies (Ali & Medrich, 1994; Anderson, 1999; Eyler, Gray & Gray, 1999). Most of these have explored the impact of service-learning on such personal qualities as efficacy, interpersonal skills, reduced stereotyping, and on social responsibility or sense of commitment to future service. This body of research consistently shows a small but positive effect of service-learning on these outcomes. Studies which have examined the impact of quality differences in service-learning have found that programs with more opportunity for reflection, substantive links between coursework and service, and ethnic and cultural diversity have a stronger impact (Eyler & Giles, 1999; Gray et al., 1999; Mabry, 1998). While we lack longitudinal studies that show a link between academic service-learning and later civic involvement, there is evidence in the youth development literature (Youngs, McEwan & Yates, 1997), as well as the work of Astin, Sax and Avolos (1999) in higher education, that volunteer service leads to subsequent community involvement. The mediating factor appears to be the development of civic identity, i.e., the personal efficacy and social responsibility that are the outcomes of both community service and service-learning.

The effect of service-learning on cognitive outcomes has been less well studied and relatively little attention has been given to defining learning outcomes that would be expected to be enhanced by service participation. Most of the reports of learning are based on student self-reports or faculty testimony (Eyler & Giles, 1999). Where attempts have been made to use grades as measures of learning, the evidence is mixed (Boroson & Yoakim, 1996; Markus, Howard & King, 1993; Miller, 1994; Kendrick, 1996). In some cases where positive results are reported the method of calculating grades has differed for treatment and comparison students so that results can be attributed to different standards or "extra credit" for service rather than increased learning (Balazadeh, 1996; Sugar & Livolsky, 1988). In other studies, it is hard to disentangle the effects...
of selectivity on reports of better grades; do better students choose to become engaged in some or does service or service-learning lead to better grades (see, e.g., Fischer et al., 1998). While few studies have attempted to articulate learning outcomes that might be particularly affected by the introduction of service-learning and useful of small studies have pointed the way and have used measures that allow students to demonstrate learning experiences and have provided evidence that service-learning has an impact on complexity of problem analysis, identification of locus of problem or solution, use of information to support arguments, creation of practical strategies for community action, cognitive moral development, and critical thinking (Buchholzer & Root, 1994; Bous, 1996; Eyster & Giles, 1996; Eyster & Malinak, 1991). While these studies are encouraging, their small scale, lack of finely differentiated treatment conditions, and lack of replication limits their usefulness.

We also have limited evidence to guide selection of service-learning strategies to enhance learning. Most studies of student outcomes have simply used "service-learning" as the predictor variable and "service-learning" covers dramatically different experiences ranging from a single visit to a soup kitchen, to a few hours a week of "extra credit" for tutoring, to an intensive semester focused on working with a community partner on a social problem. It is hard to argue that experiences so varied should be linked to improved learning, even if doing work while service may lead to increased interest or engagement in study. And because outcomes have not been well specified, studies of service-learning experiences with outcomes that bear no logical relationship to them. Stacking soup cans in a food pantry is likely to have an impact on public speaking; tutoring kids in math may have no impact on a multiple choice test in sociology; clearing a trash-filled city block is obviously not connected to improved critical thinking capacity.

A few studies have explored the impact of program characteristics (Eyster & Giles, 1997). For example, in a study of service-learning at California State University Northridge, Hedin (1980) found that opportunity for frequent reflection was the best predictor of outcomes. Subsequent research has examined the impact of program characteristics such as amount of reflection, placement quality, application, feedback, ethnic and cultural diversity, and program duration (Eyster, Giles, & Gray, 1996), but these are fairly gross measures of pedagogy. There have been no systematic attempts to test alternative, theoretically-anchored models of reflection, instruction, reflection or program planning. We know reflection is a good thing — but we don't know how to structure reflection and integrate it with service to maximize learning — or what that learning might look like.

What We Need to Know

The national survey studies and single program efforts of the past decade have provided a map of service-learning and its impact on students, but it is akin to mapping terrain with a 30,000 foot fly over. We don't have the detailed information that will help design programs that enhance cognitive outcomes. An important task for the next wave of research will be to provide this information by designing research programs that clearly articulate intellectual outcomes of service-learning and provide information on the best way to structure the instructional process to attain those goals. Important work to move the field forward is to engage scholars in related fields in the process of designing and implementing the next wave of research.

Defining and Measuring the Cognitive Outcomes of Service-Learning

We are preparing students for an increasingly turbulent society, which requires adaptability, sophisticated knowledge, life-long learning and problem solving skills (Davis & Meyer, 1996; Vail, 1997). The traditional intellectual tasks of the classroom offer a poor match with the kinds of learning that students will need to practice in the workplace and the community (Reznick, 1987). These descriptions of needed learning characteristics are remarkably similar to the qualities that have long been identified with service-learning (Axton, 1995; Barber, 1994; Ehrlich, 1997). While there are pedagogies for helping students acquire factual knowledge that are substantially less demanding on the teacher than the rigors of service-learning, we need to explore outcomes which service-learning is uniquely fitted to promote. Service-learning, which at its best allows students to confront and solve problems in complex natural contexts, appears to be ideally suited to help students develop a deeper understanding of subject matter, a practical knowledge of how community decision-making processes work, and strategies for transferring knowledge and problem solving skills to new situations. There is also reason to believe that the ability to think about the world and discover if students are able to generate a sensible strategy for tackling a new problem. We might examine whether they are able to monitor their own problem solving progress and are aware of the need to seek out further expertise. These are outcomes rarely tested in conventional classroom tests, but which are closely matched to the benefits expected from community-based learning projects. What is needed are measures that allow students to show us, rather than tell us, that they have attained greater understanding, ability to apply their knowledge, problem solving skills and cognitive development. There may be extant measures for testing some expected outcomes; others might be newly specified specifically for a course or program, especially when our concern is with deeper understanding of particular outcomes. Our design of learning outcomes and measures of student's deep understanding and ability to transfer knowledge is something that cognitive scientists have been struggling with for some time; building on their work in project and problem-based learning will advance our ability to measure the learning outcomes of service-learning.

Testing Alternative Strategies for Structuring Reflection and Service Experiences

Once we have clearly identified and developed methods to measure the most important academic outcomes, the next step will be to identify the specific organizational and instructional strategies that increase the power of service-learning to add to these outcomes. In recent years, learning scientists — particularly those interested in situated cognition and project-based learning — have experimented with a variety of methods for helping students learn from experience. Their attention has focused on such elements of instructional design as student goal setting, scaffolding that supports student and teacher learning, frequent opportunities for formative self-assessment, and social organization that promotes participation and results in a sense of agency (Baron et al., 1988). One of the particular strengths of service-learning is that it produces what Dewey (1938) called an "educative experience," i.e., an experience in which students participate in worthwhile activity which stimulates intellectual curiosity; thus it is likely to create social arrangements which lead to motivation and a sense of agency. But little attention has been paid to the role of service-learning research to testing effective ways to help students set goals, to provide appropriate cues and information for problem solving or to foster the development of self monitoring skills. As David Moore (1999) notes in a recent analysis of student experiences during school to work "preparations for future learning" (Brazwood & Schwartz, in press), in order to test the effectiveness of a particular service-learning program we might need to discover if students are able to generate a sensible strategy for tackling a new problem. We might examine whether they are able to monitor their own problem solving progress and are aware of the need to seek out further expertise. These are outcomes rarely tested in conventional classroom tests, but which are closely matched to the benefits expected from community-based learning projects. What is needed are measures that allow students to show us, rather than tell us, that they have attained greater understanding, ability to apply their knowledge, problem solving skills and cognitive development. There may be extant measures for testing some expected outcomes; others might be newly specified specifically for a course or program, especially when our concern is with deeper understanding of particular outcomes. Our design of learning outcomes and measures of student's deep understanding and ability to transfer knowledge is something that cognitive scientists have been struggling with for some time; building on their work in project and problem-based learning will advance our ability to measure the learning outcomes of service-learning.
service-learning practitioners stress working in the inder-
ently meaningful world. Some cognitive scientists are
vesting outside simulations experience to community-
ity-based projects so as to try to identify the factors
that make such projects effective. For example, in a
study exploring the learning from building and launch-
ning model rockets in a science class, it became
clear that students who worked to meet needs of a
client for information about alternate rocket design
learned more from their experience than students who
simply enjoyed watching things explode into the air
(Brasford & Schwartz, 1998). The goal setting process
used in that study, i.e. meeting the needs of a
client, is consistent with one of the basic tenets of ser-
vice-learning practice — reciprocity — a true part-
nership between students and community members
(Simon, 1979). This is just one example of some-
thing that would be useful to test; exploring the impor-
tance of goal setting with community partners on the
learning outcomes of service-learning projects might
well yield some concrete guidance for practitioners.
Cognitive scientists have experimented with a vari-
ety of ways to provide scaffolding or support for stu-
dent problem solving and for providing them with
experiences that prepare them to learn from projects
like those undertaken in many service-learning class-
es. (Burton et al., 1998; Schwartz & Brasford, 1998).
Simulations, exposure to contrasting case studies, and
sequencing of increasingly complex projects are all
instructional techniques that may enhance the ability
of students to observe more clearly in a complex com-
nunity setting and to perform at a higher level.
Service-learning practitioners need to know how to
design instruction to prepare students to get the
most and give the most in their service projects.

The ability to monitor one's own learning and real-
ize when it is necessary to seek further information is
a vital element in the ability to understand complex
subject matter and to transfer learning to new settings
(Burton et al., 1998). It is also characteristic of high-
er levels of critical thinking ability (Lynch, 1996).
Self-monitoring is part of the reflection that has long
been regarded as central to service-learning, but we
know relatively little about how to structure reflec-
tion for maximum effect. Learning scientists and ser-
vice-learning professionals could profit from work-
ging together to design and test techniques for enhanc-
ing reflection.

What Do We Need to Do This Research?
A number of groups have sponsored efforts to
identify "next steps" in service-learning practice and
research and it has the topic of cognitive sym-
piosis as professional meetings. These efforts have
tended to bog down, covering the same ground and
surfacing perennial conflicts over process and ideol-
ogy. We need to create a process to engage the
expertise of people who have developed methodolo-
gies for studying learning and to bring them together with experienced service-learning
researchers in order to design and implement a coor-
dinated research program that will produce practical
results useful to the field. The program would involve
three major phases: the design of a research pro-
gram, its implementation, and the dissemination of
the results in ways that facilitate learning.

An Interdisciplinary Task Force to Design Service-
Learning Research
A task force that trains experts on learning, prob-
lem solving and transfer of learning with service-
learning practitioners is an important first step in
developing a concrete research program focused on
the learning in service-learning. A small group
— perhaps 8-10 service-learning researchers/practi-
cioners and half a dozen learning scientists — would
meet several times to identify appropriate learning
outcomes of service-learning and to identify peda-
gogical approaches to curriculum design and reflec-
tion that would be tested across schools and col-
c eges. This group would design a series of coordi-
nated sequential experiments. Early efforts might be
oriented towards specifying and measuring the
unique outcomes that service-learning would be
expected to produce. Later studies would systemati-
cally examine alternative ways of designing service-
learning curricula and managing reflection.
Participants would test these elements of effective
design in a variety of settings, e.g., high school as
well as college classes, but the studies would be
designed to be comparable and help us accumulate
knowledge about good practice.

Implementation of Research Program
Once the task force has crafted the research design,
participants would implement it at their local institu-
tions. The research program would be coordinated
across sites, with centrally-provided resources, such
as managing the scoring of complex assessment tools
and the data analysis. Additional support would be
needed at each research site to manage the applica-
tion of the treatment pedagogy to the specific ser-
vice-learning program, the implementation of the exp-
eriments and the data collection. Data from early
waves of the research would help shape the later
studies; each site would participate in several studies
as treatments and measures were refined.

Dissemination of Research-Based Instructional Guidelines
The research process should yield approaches to
measurement that would help practitioners build
convincing assessment into their courses. In addi-
tion, the testing of alternative methods of program
organization, instruction and reflection should also
provide a basis for specifying suggestions for design
and implementation of service-learning courses.
Practitioner materials would be created based on
the research results and disseminated through profes-
sional conferences and through Learn and Serve's
National Service-Learning Clearinghouse.

Key Questions
Over the past decade we have accumulated a lot of
evidence about the impact of service-learning on
college students, but this research has relied on sur-
veys and other simple measures which do not cap-
ture the most important intellectual outcomes of this
experience. We know that service-learning has a
small but consistent impact on attitudes and percep-
tions of self, but we have less evidence for its impact
on learning and cognitive development and no evi-
dence of its effect on lifelong learning and problem
solving in community. We also have few studies about
different approaches to service-learning that would
provide guidance to instructors on how best to
optimize the impact of their service-learning courses
on students. This suggests a number of con-
ceptual and empirical questions for future research.
First we need to have a clear idea of the intellec-
tual outcomes that one might expect from well
designed service-learning classes. Some questions,
noted in experimental learning theory, need more
definitive empirical answers. These include:

- Can service-learning produce greater interest
  and engagement in subject matter?
- Can service-learning contribute to a deeper
  understanding of subject matter?
- Can service-learning promote cognitive develop-
  ment of students without formal reasoning capacity?
- Can service-learning lead to increased ability to
  solve new problems?
- Can service-learning contribute to the devel-
  opment of practical political and community
  action skills and understanding?
- Will problem solving, community action and
  learning skills as well as knowledge acquired
  through service-learning be used by students
  when they leave their community?

Second, we need to design convincing measures
of the outcomes on which we choose to focus.
Most of the intellectual outcomes we might expect
from service-learning are what Winter, McCall
c and Stewart (1981) would call "processes for oper-
ating on and using information rather than mere

Knowledge of fact and information" (p. 24). They
noted that in assessing the benefits of a liberal edu-
cation that "a concern for quick and easy measure-
ment often has usurped a concern for meaningful
content of what is measured" (p. 22). Certainly
the tendency in the service-learning research liter-
ature to assess critical thinking with a Likert
response item or learning with self-report deserves
this same criticism. Attention needs to be given to
convincing measures of important outcomes. We
need to ask questions such as:

- How can we design measures of understand-
  ing and problem solving that allow students to
demonstrate their competence rather than sim-
ply testify to it?
- How can we embed authentic assessment
tools into the service-learning experience
itself?
- What measures are appropriate for assessing
  long term continuity use for problem solving,
  community action and learning skills as well as
  knowledge acquired through service-learning?
- What tools used by cognitive scientists, devel-
  opmental psychologists and others can be
  adapted for use in measuring important in-
  tellectual outcomes of service-learning?

Third, and perhaps most important for practi-
cioners, we need to explore how particular instruc-
tional designs and techniques might enhance the
intellectual power of service-learning. While cur-
rent research hints at the importance of reflection,
there has been less given to providing empirical
evidence of particular approaches to reflection.
We need answers to questions such as:

- What kinds of preparatory activities increase
  the learning impact of service-learning?
- What kinds of scaffolding or support do stu-
  dents need to integrate their community ex-
  perience and the subject matter objectives of the
  course?
- What techniques for reflection enhance vari-
  ous outcomes and when and under what cir-
  cumstances are they employed to greatest effect?
- How do we increase students' engagement
  in personal reflection and self-monitoring of
  their learning?
- How can projects be designed to increase stu-
  dents' sense of engagement with community
  partners?
- How can community projects be shaped to
  enhance understanding of academic subject
matter?

- What strategies for service-learning increase the likelihood of long-term community use of problem solving, community action and learning skills?

Conclusion

Questions like these need to be answered to enable instructors to design experiences that will help students attain the cognitive objectives of service-learning courses. In order to create a theory-based and empirically-tested body of knowledge about design and implementation of effective service-learning, teams of researchers and practitioners need to conduct empirical studies that allow them to isolate particular instructional techniques and test their effectiveness. This body of knowledge can be created by combining the expertise of learning scientists already exploring problem-based learning with service-learning scholars. The past decade has established a firm empirical base; we know that service-learning has a small but consistent impact on a number of important outcomes and students. Now we need to push ahead to empirically answer questions about improving the academic effectiveness of service-learning.

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