

Does Participation in Quality Academic Service-Learning, Signature Service-Learning Positively Impact Students' State Achievement Test Scores?

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Abstract

Service-Learning is a teaching and learning methodology that utilizes experiential learning and combines academic study, community service, reflection, student voice, civic participation, community partners' involvement, and assessment. This study involves three years of data for three elementary schools in Hudson, Massachusetts. One of the three schools engaged fourth graders in high quality academic service-learning, known as *Signature Service-Learning*. The study found that *Signature Service-Learning* students had significantly higher scores on state mandated assessments than students who took service-learning courses that had less adherence to quality standards. Implications of this study are that quality of service-learning matters and can significantly affect program outcomes.

Introduction

Once a month, fourth grade students at one of Hudson's elementary schools hike into the woods that adjoin their playground and field areas. Students wear rubber boots and they carry data sheets, pens, measuring sticks and guidebooks. Accompanying the students are parent volunteers, wearing boots or waders, engaged in discussion with their group of students. There is a sense of purpose as well as excitement as the students, parents and teachers traipse off to the special area that opens through a gate onto a boardwalk stretching into the wetlands. The sturdy boardwalk was funded through a National Science Foundation's President's Award for Elementary Science that one of the teachers received. The boardwalk was designed and built by volunteers from Intel, one of Hudson's community partners (Berman & McCarthy, 2006).

Upon entering the gate, the group stops. There is complete silence as everyone listens intently to the sounds of the wetlands. At their teachers' request, students offer specific bird or other sounds they have heard. After documenting their listening, each group heads off to its special plot that students attend to each time they visit the wetlands to document the changes they observe and study the ecosystem of the area (Berman & McCarthy, 2006).

The wetlands are named for veteran teacher Dawn Johnson-Sather because her students, along with the students from three other fourth grade classes, collected sufficient data to certify the area as an environmentally protected vernal pool. A vernal pool is a seasonal wetland area that supports the spring growth of certain specific species like the fairy shrimp, wood frogs and salamanders. If vernal pools are not certified, the area is not protected from building and the loss of the species. The process is long and involves significant data and paperwork. The students and

teachers submitted the documentation and were successful in having the vernal pool certified by the National Heritage Program of the Massachusetts Division of Fisheries and Wildlife. Succeeding classes of fourth graders have assumed the role of conservationists as they systematically log the data and take care of the area. Their data logs chart the date, air temperature, water temperature, muck temperature, water level of the vernal pool, water level near the wood bridge, water level near the drain pipe, and weather conditions (Roberts, 2003).

The study of water through the wetlands is hands-on, experiential learning that includes student inquiry, observation, reasoning and predicting as part of the scientific process of learning. Students' study connects to the study of water in the Massachusetts Curriculum Frameworks. Reflective activities include journals that students write when they return to their classrooms from the wetlands. The students use rubrics to guide their writing that is aligned with the Massachusetts Frameworks composition strand. The class reads the book *She's Wearing a Dead Bird on Her Head!*, a book that recounts the story of the founding of the Audubon Society.

In service to their school and larger community, students create posters to promote Hat Day at their school. The students collect money and donate half to the Organization for the Assabet River, a community partner of the wetlands, and the other half to the Audubon Society. Serving the community through awareness building and advocacy, the students also create bio-diversity posters of species native to Massachusetts and especially to their wetlands. These posters are created through cooperation with the art teacher. The original student posters are reviewed and then produced by the Vernal Pools Association. The colorful laminated posters have been presented to the Department of Education, representatives of the Massachusetts House and Senate, the local Board of Selectmen, Public Works and to the Hudson School Committee.

Service-learning has been institutionalized on a Pre K-12 basis in Hudson Massachusetts Public School District since 1993. The superintendent for virtually all of this time is a national leader in the field of service-learning and co-chair of the CSL Advisory Committee to the Massachusetts Board of Education. Hudson has a teacher-led Community Service-Learning Committee, as well as a director, who oversees the district's Service-Learning. The district's support for service-learning includes a yearly introduction to service-learning for new faculty, curriculum coordination meetings by grade and discipline, a graduate level course in Service-Learning taught by the Hudson's service-learning director and the chairperson of the CSL Committee in conjunction with Worcester State College. Hudson's high school and middle school are National Service-Learning Leader Schools and the four elementary schools as Massachusetts Service-Learning Leader Schools.

The institutionalization of service-learning is also supported by district and school committee policies supporting Service-Learning. Federal grants from Learn and Serve America have been secured through the Massachusetts Department of Education and the Massachusetts Service Alliance. The service-learning supported by these grants has typically had the requirement of alignment of curricula with the Massachusetts State Frameworks. In certain classes and

courses, the service-learning has been repeated on a yearly basis and the significant curricular connections have deepened over time. In Hudson Public Schools, these quality academic service-learning experiences are designated as *Signature Service-Learning*. The fourth grade wetlands service-learning has continued to be developed and deepened over the past ten years and thus qualifies to be designated as *Signature Service-Learning*.

Cohorts of fourth graders at the Forest elementary school described earlier in this article have been engaging in service-learning for 10 years. Although there are many definitions of service-learning, the core concepts are service to the community combined with learning and reflection. The National Commission on Service-Learning definition is widely accepted: "Service-Learning is a teaching and learning approach that integrates community service with academic study to enrich learning, teach civic responsibility and strengthen communities" (McCarthy & Corbin, 2003). Key components of service-learning in schools include curricular learning, community service, reflection, student voice, civic engagement, community partners, assessment and celebration (McCarthy & Corbin, 2003).

According to the National Center for Education Statistics, in 1999 service-learning was included in more than 50 % of all high schools and in one-third of all public K-12 schools (Billig, 2004). A 2000 W.K. Kellogg Foundation study conducted a national telephone survey of more than 1000 adults to find how knowledgeable Americans were about service-learning programs, whether they supported service-learning and what they perceived as benefits of and concerns about service-learning. More than 80 % defined a good education as including opportunities for young people to enhance their academic skills through real-world situations. About 61% were not familiar with the term service-learning but when such programs were explained, approximately 90 % of adults supported the presence of service-learning programs in their schools (Kenney and Gallagher, 2003). Confusion still exists concerning definition of terms since community service and service-learning are not synonymous.

Literature Review

Research on service-learning has a 30 year history with more rigorous studies coming to the fore in the past ten years. Prior to 2000, the majority of published articles on service-learning were anecdotal descriptions and evaluations that did not use rigorous designs (Billig, 2000; Eyler, Giles & Gray, 2000). While scholarly research and larger scale studies have and continue to be undertaken, the scope of the field of service-learning has grown to be both broader and more complex. Furco has identified six education domains that past studies have shown to be positively correlated with participation in service-learning: academic, career, social, personal, ethical, and civic responsibility. Service-Learning has multi-dimensional effects; however, he notes that most studies only focus on one domain (Billig & Waterman, 2003). A further difficulty in documenting the effectiveness of service-learning comes from the fact that the range of impacts is broader for service-learning than for traditional instruction wherein the range of impact is viewed as relatively narrow (Billig & Waterman, 2003).

While many studies have indicated significant impacts for student engagement in learning, civic outcomes and positive relationships of students and community organizations, documented academic outcomes of service-learning are not as prevalent (Billig & Waterman, 2003). Jeffrey Howard in *Service-Learning Research: Foundational Issues* (Billig & Waterman) explained that since experimental research methodology relies on equal treatment across individuals in the treatment group, but in service-learning there are many variables beyond the control of the researcher that typically make such randomization impossible. In addition to lack of true control groups and sampling shortcomings, there are many instances of small studies that focus on unique service-learning programs that can not be easily generalized and larger studies, where significant results for some of grades were found but not others.

Given the increased emphasis on statewide mandated proficiency testing, the leadership of school districts and schools are increasingly interested in efforts to link students' involvement with service and documented gains in measured outcomes. Since there is often additional time involved in curricula that utilize service-learning, today's schools need to justify hours, even minutes, which are dedicated to learning. Thus, in many ways, the field of service-learning needs additional studies that show that the learning in service-learning contributes to documented increases in student's learning achievement. Many question whether such tests should be the sole measure of educational assessment. But they are undoubtedly valuable for many purposes. For example, according to David Payne, "Although classroom assessments are the best single source of information about the academic link in service-learning, under the right controlled conditions, standardized achievement tests can yield valuable data" (Payne, 2000, p.40).

Shelley Billig, in her summary of the research literature, indicated that there are still only a scant number of studies associated with the academic impact of service-learning, and the results of those that try to address this issue often are mixed (Billig, 2003). For example, she included information from a study of Michigan Learn and Serve that examined the impact of participation on student' school engagement and on performance on the state assessment examination called the Michigan Educational Assessment Program (MEAP). The study involved 1988 students, 1437 of whom participated in service-learning. Results of this study showed that service-learning was positively associated with test scores on the MEAP for students in the fifth grade. But no significant differences were found among students at the other grade levels that were tested. In the *Philadelphia Need in Deed* study 6th grade students who participated in *Need in Deed*, a service-learning program, were found to have statistically significant higher test scores on the Terra Nova, a standardized test in the areas of language arts and science. However, once again, the same effects were not found for the fourth and eighth grade participants. There were qualitative data that suggested the observed differences in outcomes may be due to the content of the service-learning activities and the quality of the service-learning experiences (Billig). But there are no clear conclusions to be drawn from this mixed record.

Nevertheless, Billig offers the conclusion, "while there are still too few studies on the academic impact of participation in service-learning, the trend revealed by (these) studies is generally

positive. Students who participated in service-learning were found to have scored higher than nonparticipating students in several studies, particularly in social studies, writing and English/Language Arts” (Billig, 2004, p. 6).

The literature reviewed here provides some encouragement, but as of yet, has not proven that service-learning leads to the kinds of positive learning outcomes that its advocates believe to be the case.

Core Hypothesis

The H1 hypothesis that was addressed in this research is that participation of students in high quality service-learning such as the Hudson *Signature Service-Learning* experiences will positively impact their Massachusetts Comprehensive Achievement Scores (MCAS).

Methods

Students in four fourth grade classes at one of three elementary schools in the district participated in the wetlands *Signature Service-Learning* over three years. The service-learning involved science, reading, language arts and mathematics. In total were over 634 students involved or approximately 210 students each year. Students in the other district elementary schools did not participate in the *Signature Service-Learning*, although as part of the district’s policy and expectation, students in each of the fourth grades did participate in other service-learning experiences which were not of the duration or curricula integration of the wetlands service-learning. In other words, while all three schools’ fourth graders participated in various service-learning projects, the service-learning at the other schools was not at the level of *Signature Service-Learning*.

That plan was to compare three years (2003-2006) of students’ test scores on fourth grade MCAS of students who participated in the wetlands *Signature Service-Learning* with those students who were involved in lesser service-learning opportunities.. The plan was also to control for student characteristics such as gender; income (measured by receipt of free and reduced lunch); limited English proficiency and Special Education status. The district collected these data on a yearly basis. Data were also collected to make it possible to control for teachers’ educational level and experience in order to determine whether these were factors in student success. ¹ Two statistical approaches were utilized, t-tests and regression analysis using raw scores in ELA and Math in MCAS as dependent variables.

Results

Table A in the appendix to this paper shows the results of the regression analysis for the English language proficiency examination (ELA score) using all of the available data, including gender (being a boy) ; FRL,(receipt of free and reduced lunch); LEP, (limited English Proficient); Sped,

(Special Education), and the two teacher factors included: DCODE (Degree Code) and Years Experience. Neither teachers' educational level nor experience showed significance, with p-values of .396 and .676 respectively.

As is shown in Table B in the appendix, the decision was made to exclude the teacher experience variables from further analysis, coming up with the preferred model. As can be seen in the table, whether or not students were from Forest Elementary School—and hence whether or not they received the high quality service-learning experience-- was a significant explanatory variable with a p-value below the conventional 5% significance level. Being in the school that has *Signature Service-Learning* was associated with 1.290 points more on the MCAS ELA test than for students who were not at the school named Forest with the other student descriptors controlled for.

Table C shows that the data more powerfully supports the same conclusions for the mathematics proficiency tests. Our results show that the students at the Forest Elementary School who participated in *Signature Service-Learning*, scored 4.691 points higher than similar students at the other two elementary schools, with a p-value of .000.

Discussion

The intent of the study was to be able to compare state criterion-referenced test results (MCAS) of students who were engaged in *Signature Service-Learning* with students in the same grade who participated in service-learning but were not involved in that yearly *quality* academic service-learning. The purpose was to attempt to measure the academic impacts of *Signature Service-Learning* through a study that utilized standardized testing on the state level. The results suggest that the quality service-learning offered at the Forest School are indeed leading to the observed enhanced outcomes on MCAS, but they do not prove it. For example, there may have been many other important differences between the Forest School and others that were not taken into account in our quantitative analysis. Those familiar with the school district believe that the three schools are similar, but it is certainly possible that there were other unmeasured differences including the academic preparation of students in the first through third grades and other factors pertaining to the students' fourth grade education.

In addition, it is important to remember that the study compares *quality* service-learning with less intensive but still solid service-learning, and thus has limited value in determining whether quality service learning is more effective than no service-learning at all. It does, of course, bolster the arguments that service-learning policy-makers and practitioners should devote increased attention to the quality of the offerings.

Finally, finding that teacher education and experience did not have significance was surprising. Worth acknowledging is that educational degrees and years of teaching experience do not provide a full picture of teaching effect. There is no way with only those two variables to fully measure

teaching pedagogy, which is a strong factor in teaching and students' successful learning. So, the interaction effect of teachers' expertise as part of their pedagogy can not be ruled out.

Hopefully, this study's results will encourage others to conduct studies to ascertain the academic impact of service-learning—and in fact *high quality* academic service-learning-- on students' standardized academic achievement test scores.

ENDNOTES

¹ The students were coded as being at the particular school or not at the school; for sex as boy or not boy; free and reduced lunch or not free and reduced lunch; limited English proficiency or not limited English proficiency; students in Special Education or not students in Special Education. While the student data was available in the district, the teacher data needed to be compiled. It was necessary to construct a table of teachers' names, years of education and experience and to look up historical data to determine which teachers were teaching fourth grade in each school during those years. Information was secured from Human Resources with the superintendent's permission. Teachers were assigned letters and numbers to keep confidentiality. Teachers' years of education, DCODE (Degree) equated with their designation on the teacher' salary scale. Bachelors was indicated as 1, B15 was 2, B30 was 3; Masters was 4; Masters plus 15 was 5; Masters plus 30 or Advanced was 6. Years of experience were included as the number represented. One year was 1; two years of experience was 2; etc.

Appendix

RESULTS OF REGRESSION ANALYSES

Table A

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	51.862	.849		61.072	.000
	Forest	1.037	.775	.060	1.338	.181
	Boy	-1.351	.625	-.082	-2.163	.031
	FRL	-5.184	.817	-.243	-6.345	.000
	LEP	-4.817	2.386	-.077	-2.019	.044
	Sped	-2.720	.753	-.137	-3.611	.000
	DCODE	.287	.338	.047	.849	.396
	Years Experience	-.022	.052	-.026	-.419	.676

a. Dependent Variable: ELA Raw

Table B

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	52.542	.532		98.685	.000
	Forest	1.290	.628	.077	2.055	.040
	Boy	-1.520	.598	-.095	-2.540	.011
	FRL	-5.210	.777	-.253	-6.709	.000
	LEP	-4.887	2.290	-.080	-2.135	.033
	Sped	-2.835	.721	-.148	-3.930	.000

a. Dependent Variable: ELA Raw

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	4884.009	5	976.802	17.410	.000 ^a
	Residual	35290.738	629	56.106		
	Total	40174.746	634			

a. Predictors: (Constant), Sped, LEP, Forest, Boy, FRL

b. Dependent Variable: ELA Raw

Table C.

Coefficients^a

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	36.369	.600		60.649	.000
	Forest	4.691	.706	.238	6.643	.000
	Boy	1.204	.673	.064	1.788	.074
	FRL	-5.901	.870	-.244	-6.781	.000
	LEP	-9.020	2.151	-.151	-4.193	.000
	Sped	-4.193	.812	-.186	-5.161	.000

a. Dependent Variable: Math Raw

ANOVA^b

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	10542.293	5	2108.459	29.605	.000 ^a
	Residual	45153.307	634	71.220		
	Total	55695.600	639			

a. Predictors: (Constant), Sped, Forest, LEP, Boy, FRL

b. Dependent Variable: Math Raw

REFERENCES

- Berman, S. & McCarthy M. (2006). The connection between character, service, and social-emotional learning. In *The educator's guide to emotional intelligence and academic achievement* .(Eds.)Elias, M.J. & Arnold, H. Thousand Oaks, CA: Corwin Press.
- Billig, S. (2004). *Heads, hearts and Hands: The research on K-12 service-learning*. Denver: RMC Research Corp.
- Billig, S. & Waterman, A.S. (2003). *Studying service-learning: Innovations in education research methodology*. Mahwah, NJ: Lawrence Erlbaum Associates.
- Eyler, J. & Giles, Jr. D.E. (1999). *Where's the learning in service-learning*. San Francisco. Jossey-Bass.
- Kenny, M. & Gallacher, L. (2003). *Teenagers and Community Service: A guide to the issues*. Westport, CT: Praeger Publishers.
- McCarthy, M & Corbin. L. (2003). The power of service-learning for America's schools. *Principal*, 82(3), 52-55.
- Payne, D. (2000). *Evaluating service-learning activities & programs*. Lanham, MD: The Scarecrow Press, Inc.
- Roberts, P. (2002). *Kids taking action: Community service learning projects, K-8*. Greenfield, MA: Northeast Foundation for Children.
- Wade. R.C. (1997). *Community service-learning: A guide to including service in the public school curriculum*. Albany: State University of New York Press.

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