Does Service-Learning Increase Student Learning?: A Meta-Analysis

Jami L. Warren
University of Kentucky

*Research studies reflect mixed results on whether or not service-learning increases student learning outcomes. The current study seeks to reconcile these findings by extending a meta-analysis conducted by Novak, Markey, and Allen (2007) in which these authors examined service-learning and student learning outcomes. In the current study, 11 research studies satisfying particular criteria were included. Results suggest that service-learning does in fact increase student learning (*d = .332). Results from moderator analyses suggest that service-learning has a positive influence on student learning outcomes irrespective of the way learning was measured.*

Experiential learning methods, including service-learning, are increasing among universities across the United States. Many disciplines share in this enthusiasm, with an increase in academic courses across disciplines, including communication, using the service-learning pedagogy (Oster-Aaland, Sellnow, Nelson, & Pearson, 2004; Sellnow & Oster, 1997). By definition, service-learning is a pedagogical strategy in which students engage in community service that will enhance their understanding of course concepts and enable them to make contributions to their communities (Rhodes & Davis, 2001). Furthermore, Eyler and Giles (1999) suggest that the service-learning experience needs to satisfy four criteria to be considered successful: (1) personal and interpersonal development, (2) understanding and applying knowledge learned in class, (3) perspective transformation, and (4) developed sense of citizenship.

A significant amount of research exists regarding the positive effects of service-learning on many areas of learning including higher order thinking (Eyler & Giles, 1999), empathy (Lundy, 2007), cultural awareness (Bloom, 2008; Borden, 2007; Gutheil, Chernesky, & Sherratt, 2006), personal and interpersonal development (Gullicks, 2006), motivation to engage in social issues (Lee, Olszewski-Kubilius, Donahue, & Weimholt, 2008), motivation to study (Flournoy, 2007), life skills (Astin & Sax, 1998), self-efficacy (Simons & Cleary, 2006; Stewart, 2008), and civic engagement/ responsibility (Astin & Sax, 1998; Einfeld & Collins, 2008; Gullicks; Lee et. al.; Prentice, 2007; Simons & Cleary).

However, one important unanswered question regarding service-learning is whether this pedagogical method increases student learning outcomes beyond traditional pedagogical methods. Because administrators and educators often desire proof that a concept "works" or provides significant improvement in student learning over traditional methods to support and/or fund such an initiative, several researchers have recently attempted to provide evidence that service-learning leads to increased student learning. However, the results of these studies are mixed. For instance, Kendrick (1996) compared service-learning and non-service learning students in an Introduction to Sociology course and found that service-learning students performed slightly better than non-service learning students on their quizzes and essay questions. On the other hand, Moely, McFarland, Miron, Mercer, and Ilustre (2002) compared service-learning and non-service learning students and found that service-learning students reported a slight decrease in learning about the academic field over the course of the semester, although it was not as large as the decrease shown by students not participating in service-learning.

To reconcile these mixed findings, Novak, Markey, and Allen (2007) conducted a meta-analysis evaluating the cognitive outcomes of service-learning in higher education. They examined nine studies and found an overall positive relationship between service-learning and learning outcomes (d = .424). While this meta-analysis provides a significant contribution to the understanding of the relationship between service-learning and student learning outcomes, there were also several problems with this meta-analysis. First, Novak et al. did not include unpublished literature in their analysis. While not all meta-analyses include unpublished data, it is important to do so to avoid an upward bias in the effect size found (Lipsey & Wilson, 2001). Second, although Novak and colleagues found heterogeneity in their sample, they did not conduct sufficient moderator analyses to explore why their sample was heteroge-

neous. For instance, although many of the studies in their review examined such concrete measures of learning as course exams and/or assignment scores, others relied on student and/or faculty self-reported learning measures. The difference in the way learning was measured by the studies included in their meta-analysis might have contributed to the heterogeneity found in their sample. However, this possibility was not explored in their meta-analysis.

Scholars have distinguished between concrete measures of learning and self-reported learning. For example, Chesebro and McCroskey (2000) examined the correlation between students' self-reported learning and their actual recall of lecture material in a large-lecture communication course. They discovered a moderately significant correlation between self-reported learning and actual recall of lecture material ($r = -.50$, $p < .001$). Although this correlation is significant, if self-reported learning measures are accurate measures of learning, it seems that the correlation between the two should be much stronger. Because student self-reported learning can be affected by a number of other variables such as teacher immediacy, liking the course and/or instructor, and so on, it is important to distinguish between these two measurement techniques, which Novak et al. (2007) did not do.

Therefore, the current meta-analysis seeks to build on the Novak et al. (2007) meta-analysis so as to further clarify the relationship between service-learning and student learning outcomes by considering unpublished literature and distinguishing between self-reported and concrete measures of learning such as exams and other assignment scores. Additionally, this meta-analysis only examines studies comparing service-learning and non-service learning students' learning outcomes.

Method

Search Strategy

To conduct a comprehensive search of studies through March 2009, several strategies were employed. First, the nine studies included in Novak et al.'s (2007) meta-analysis were collected. Next, comprehensive searches of electronic databases such as *Ebscohost* and *ERIC* were conducted. Keywords including *service-learning* and *learning outcomes* were used in this search. Third, because the *Michigan Journal of Community Service Learning* publishes service-learning research, a manual search of this journal was conducted.

To include unpublished work related to student learning with service-learning, an email message soliciting unpublished studies was sent to seven prominent researchers in the field, resulting in three responses. As a result of one of those responses, a message soliciting unpublished studies was also sent to the National Communication Association service-learning listserv. Finally, a manual search of the 2008 International Research Conference on Service-Learning and Community Engagement conference program was conducted.

All studies identified in the above searches were considered for inclusion in this meta-analysis. To make the final cut, the studies had to meet the following criteria: (a) examined the relationship between service-learning and student learning outcomes; (b) measured student learning as a dependent variable; and (c) included an experimental and control or comparison group.

Sample

A total of 14 studies, including the nine studies included in Novak et al.'s (2007) meta-analysis, were examined to determine if they met the three criteria. Two were excluded because they did not include a comparison or control group, and one was excluded because it only measured self-efficacy as a dependent variable and not student learning. A final set of 11 studies meeting the three criteria—including three new published studies, two unpublished studies, and six included in Novak et al.'s (2007) study—became the sample for the present meta-analysis.

Article Coding

Articles were coded on many dimensions by the researcher. Features coded included demographic and sample characteristics as well as intervention and methodological characteristics such as the number of service hours students were required to complete, the type of study design, and the measure of learning used. Self-reported and concrete student learning outcome measures also were coded for each study. If both outcome measures were reported, effect sizes were calculated for both measures.

Effect Size Extraction and Calculation

Cohen's *d*, or the difference between treatment and control means divided by the pooled standard deviation, was used as the effect size indicator (Lipsey & Wilson, 2001). Effect sizes were calculated using data reported in the article (i.e., means and standard deviations, *t*-test, *F*-test, etc.) using the appropriate formulas. In most of the cases, outcome data were reported for only one time point. However, in a few cases, multiple exam scores were reported (i.e., mid-semester and final exam scores). In these cases, the last exam score of the semester was used to calculate the effect size. Additionally, some studies reported data for each item measuring student self-reported learning. In these cases, an effect size for each item was calculated and then averaged to get an overall

effect size for that measure. Finally, if insufficient data were reported to calculate an effect size, which was the case with one study, the article was coded as having a zero effect size because there were no statistically significant differences between the experimental and control groups.

Meta-Analytic Approach

Effect sizes were weighted by sample size and combined using standard fixed effects meta-analytic procedures. The Q statistic was used to examine whether significant heterogeneity was present among the effect sizes. Effect sizes were calculated for the moderator variable discussed earlier—learning outcome measure. All analyses were conducted using Comprehensive Meta-Analysis software, Version 2.0.

Results

The 11 studies had a cumulative student sample size of 2129 and were published or written (if unpublished) between 1993 and 2008. All studies were conducted using quasi-experimental designs and involved undergraduate student samples. A variety of course disciplines were represented in these studies, including education, English, mass communication, pharmacy, political science, psychology, rehabilitation services, and sociology. Of the 11 studies, two reported only student self-reported learning outcomes, two reported both exam scores and student self-reported learning, three reported only exam scores, two reported other assignment scores, and two reported a post-test cognition measure (see Table 1 for study characteristics).

Overall Effects of Service-Learning on Learning Outcomes

All 11 studies reported learning outcomes, and the sample size-weighted mean effect size was $d = .332$ (95% CI = .246, .419; $Z = 7.562$; $p = .000$; $N = 2129$). This suggests that service-learning has had statistically significant and positive effects on student learning outcomes.

Heterogeneity and Moderators

Next, heterogeneity was examined. Statistical testing suggested significant heterogeneity among the studies, $Q = 24.550$; $p = .017$. Therefore, intervention moderator analyses were conducted. Both measures of learning, including student self-reported learning outcomes and more concrete measures of learning such as exams and other student assignment scores, were significantly and positively related to student learning (for self-report: $d = .365$, $p = .000$; for exams and student assignments: $d = .311$, $p = .000$). Although, as expected, student self-reported learning yielded greater effects on student learning outcomes than more concrete measures of learning, there was not a statistically significant difference between the self-report and concrete measures. Concrete measures of learning, then, were further divided into subcategories, including exam scores, other student assignment scores, and post-test measures of cognition. Once again, as expected, measures of student self-reported learning yielded greater effects on

Table 1

Characteristics of Studies Included in this Meta-Analysis.

Study	Sample	Discipline	Outcome Measure Reported
*Cohen & Kinsey (1994)	217 undergraduates	Communication	Student self-report
*Feldman et al. (2006)	32 undergraduates	English	Assignment scores
**Jenkins (2008)	69 undergraduates	Political Science	Post-Test Cognition Measure
*Kendrick (1996)	122 undergraduates	Sociology	Exam Scores, Student self-report
*Lundy (2007)	192 undergraduates	Psychology	Exam Scores
*Markus et al. (1993)	89 undergraduates	Political Science	Exam Scores, Student self-report
**McIntyre (2008)	173 undergraduates	Communication	Post-Test Cognition Measure
*Moely et al. (2002)	536 undergraduates	Multiple Courses	Student self-report
*Mpofu (2007)	130 undergraduates	Rehabilitation Services	Exam Scores
*Osborne et al. (1998)	92 undergraduates	Pharmacy	Assignment Scores
*Strage (2000)	477 undergraduates	Education	Exam Scores

* published manuscript
** unpublished manuscript

learning outcomes than exam scores (for self-report: $d = .365$, $p = .000$; for exams and student assignments: $d = .259$, $p = .000$). However, again, t-tests revealed there were no statistically significant differences between the self-report and concrete measures.

Discussion

Consistent with Novak et al.'s (2007) meta-analysis, the results of the current study suggest that service-learning has a positive effect on student learning outcomes. This is an encouraging result for educators and administrators considering implementing a service-learning component into their courses or at their universities. Not only does service-learning have positive benefits such as increased multicultural awareness and enhanced social responsibility, but it also increases student learning outcomes, the gold standard when measuring pedagogical practices. The current study sought to build on Novak et al.'s meta-analysis by including unpublished work and considering potential differences between student self-reported learning measures and more concrete measures of learning such as exams and other student assignment scores. Although the results of the current study suggest that measures of student self-reported learning produce greater effects than concrete measures of learning, there were no statistically significant differences between the two measures. In essence, this may suggest that it does not matter how student learning is measured. Service-learning likely has a positive effect on student learning regardless of the learning measure employed. This result also suggests that students have a fairly accurate perception of their own learning.

The current meta-analysis indicates that a service-learning approach can increase student learning outcomes. However, the studies examined in this meta-analysis suffer from problems that can be avoided in future research. One significant problem consistent across the studies is the lack of discussion regarding theory development around service-learning and learning outcomes. Although many of the studies report the positive influence that a service-learning approach has on student learning outcomes, it is not clear why this is so. For instance, what is it about service-learning that has the ability to influence students' learning of course concepts beyond that of a traditionally taught course? Researchers have begun to theorize about service-learning and its influence on learning outcomes, though the proposed theory has not yet been tested (Warren & Sellnow, 2010). Warren and Sellnow suggest that theoretical conclusions can be drawn from existing service-learning research. For example, research suggests that service-learning increases student engagement (Rockquemore & Schaffer, 2000) and that when stu-

dents are engaged, they are more motivated to study (Flournoy, 2007; Shulman, 1995). As a result, they learn more, both cognitively and affectively (Frymier, Shulman, & Houser, 1996).[1] However, this theory has not been tested; therefore, future researchers might consider spending time fleshing out and testing this theory. In addition, researchers might develop, test, and refine other theories explaining the relationship between service-learning and learning outcomes.

The current study also has limitations. The generalizability of these results is problematic. Although an attempt was made to include unpublished work in this meta-analysis, responses to email and listserv solicitation only resulted in two unpublished studies. It is possible that more unpublished work exists that was not included in this study and could potentially affect the results. In addition, we were not able to gauge the quality of the service-learning experience in each of the included studies; quality, of course, is an important factor in determining student learning outcomes. Next, the studies included in this meta-analysis only examined college student populations. This precludes applying the findings to k-12 students. Finally, this meta-analysis only included 11 total studies. This is largely because many of the studies that could have been included did not report data that allowed for meta-analysis.

Therefore, it is important for future researchers to include such data when reporting on student learning outcomes. First, researchers can include a comparison group when examining service-learning outcomes so that they can be sure the results obtained are attributable to the pedagogy and not to some other factor. In addition, when reporting outcome data on groups (treatment and comparison groups for instance), it would be helpful to include means, standard deviations, and sample sizes of both groups. This will allow researchers to compare findings across studies and determine overall effect sizes.

While this study provides us with a positive outlook on service-learning, it is important for researchers to continue conducting rigorously-designed studies on the learning outcomes associated with service-learning. Additionally, because studies were not found that examined populations beyond college students that met the inclusion criteria for this meta-analysis, it will be important in the future to conduct research with elementary, middle, and high school students to determine service-learning's effect on them as well. This will provide educators and researchers with a more comprehensive picture of service-learning's effect on the learning of students of all ages.

Conclusion

Research on service-learning has shown positive effects on many aspects of students' lives including

cultural awareness, social responsibility, and student cognitive learning outcomes. These are encouraging results for advocates of service-learning. Continued research on service-learning, especially on populations beyond college students as well as on theory development to explain why researchers and educators are seeing such promising effects, is still needed. But in the meantime, educators can rest easy knowing that service-learning projects are likely to have positive and important learning benefits for their students.

Note

[1] See the theoretical model outlined in figure 7.1 in Warren & Sellnow (2010) for further detail.

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Author

JAMI WARREN (jami.warren@uky.edu) is a faculty lecturer in the Division of Instructional Communication at the University of Kentucky, where she completed her bachelor's, master's, and doctoral degrees. Her work focuses primarily on instructional communication, and more specifically, on service-learning and student learning outcomes. She recently co-authored a chapter on service-learning in the communication discipline in The Sage *Handbook of Communication and Instruction*.