



## Research Brief

### Key Highlights:

Data analysis from the 2012 National Survey of Student Engagement (NSSE) found that students at Indiana University-Purdue University Indianapolis (IUPUI) who participated in one or more service learning courses had higher mean scores on all three measures of deep learning. These include:

Higher order learning

Integrative Learning

Reflective Learning

The results were statistically significant for both freshmen and senior students.

### The Relationship between Service Learning and Deep Learning

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#### Research Question

Do college students who participate in service learning courses report higher levels of deep learning skills than students who do not participate in service learning courses? This report describes the analysis of 2012 National Survey of Student Engagement (NSSE) data from freshmen and seniors on one campus to understand the relationship between service learning and deep learning.

#### Introduction

The Center for Service and Learning (CSL) at Indiana University-Purdue University Indianapolis (IUPUI) promotes educationally meaningful service to further the academic and public purposes of higher education (<http://csl.iupui.edu>). IUPUI is recognized as a national leader in service learning and civic engagement programs, earning the inaugural U.S. Presidential Award for Exceptional Accomplishments in Community Service and Honor Roll for Community Service designations, as well as the Carnegie Classification for Community Engagement. Over the past two decades, the number of service learning courses has increased each year, with roughly 10,000 students participating in over 500 sections of service learning courses in 2012-13. Enrollment in service learning courses is not a requirement for graduation. Continual assessment and improvement of service learning courses is a campus priority. The CSL conducts research to understand the impact of service learning on students, faculty, staff, and the community. The 2012 administration of NSSE provided a good opportunity to explore the association between an IUPUI student's participation in service learning courses and their reported level of deep learning.

#### National Survey of Student Engagement

Nationally, NSSE has been administered since 2000 and the survey has been used at IUPUI since 2002. NSSE is a valuable tool as institutions seek to understand and improve academic quality by

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addressing issues that can affect undergraduate student learning. Results from NSSE are used to assess the impact of various curricular and co-curricular activities on student growth and development. In addition to benchmark measures and engagement indicators, NSSE contains questions designed to measure deep learning skills.

Deep learning, as compared to surface learning, describes the extent to which a student engages in the learning process. Students who use deep learning strategies make more robust connections to course material by emphasizing learning activities such as integration, synthesis, and reflection (National Survey of Student Engagement, 2012). By making deeper connections, students focus on both the substance and the underlying meaning of their studies. Students learn to apply the knowledge gained to real life situations and successfully integrate this with prior learning. Additionally, "deep approaches to learning have been associated with numerous positive outcomes including higher grades, and the ability to retain, integrate and transfer information at higher rates, not to mention greater satisfaction with the learning experience" (Laird, Shoup, & Kuh, 2006). In short, students become more engaged and as a result are willing to delve more deeply into the learning process.

### **Service Learning Courses**

Service learning is defined as a "course-based, credit bearing educational experience in which students (a) participate in an organized service activity that meets identified community needs, and (b) reflect on the service activity in such a way as to gain further understanding of course content, a broader appreciation of the discipline, and an enhanced sense of personal values and civic responsibility" (Bringle & Hatcher, 2009, p. 38). Participation in service learning courses has been shown to have significant positive effects on several outcome measures:

- Academic performance - GPA, writing skills, critical thinking skills
- Values - commitment to activism and to promoting racial understanding
- Self-efficacy
- Leadership - leadership activities, self-rated leadership ability, interpersonal skills
- Choice of service career
- Plans to participate in service after college (Astin, Vogelgesang, Ikeda & Yee, 2000)

Students are engaged in active learning that is often unpredictable and complex within the community setting. They are challenged to link this experience with course readings and to critically think about both the text and the service experience. By its very nature, service learning can be expected to contribute to gains in deep learning.

## Prior Analysis of Deep Learning

NSSE researchers have identified three constructs that comprise deep learning. Cognitive interviews were conducted to ensure that students were interpreting the survey questions as the researchers intended. Through extensive validation studies, the psychometric properties of the survey items were found to be acceptable. Exploratory and confirmatory factor analyses suggest that the survey “contains a reliable measure of students’ uses of deep approaches to learning with three subscales: higher-order learning, integrative learning, and reflective learning” (Laird, Shoup, & Kuh, 2006).

**Higher-Order Learning** – How much courses emphasize advanced thinking skills such as applying theories to practical problems or synthesizing information into new interpretations

**Integrative Learning** – Integrating ideas from various sources, including diverse perspectives in coursework, and discussing ideas outside of class

**Reflective Learning** – Examining one’s own thinking and the perspectives of others (National Survey of Student Engagement, 2012)

## Deep Learning Survey Questions

The deep learning survey questions were administered to IUPUI freshman and senior students using the following response format: *Very Often, Often, Sometimes, Never*.

### Higher-Order Learning (4 items)

*During the current school year, how much has your coursework emphasized the following mental activities?*

- Applying theories or concepts to practical problems or in new situations
- Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components
- Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions
- Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships

### Integrative Learning (5 items)

*In your experience at your institution during the current school year, about how often have you done each of the following?*

- Worked on a paper or project that required integrating ideas or information from various sources
- Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments
- Put together ideas or concepts from different courses when completing assignments or during class discussions
- Discussed ideas from your readings or classes with faculty members outside of class
- Discussed ideas from your readings or classes with others outside of class (students, faculty members, co-workers, etc.)

#### Reflective Learning (3 items)

*During the current school year, about how often have you done each of the following?*

- Examined the strengths and weaknesses of your own views on a topic or issue
- Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
- Learned something that changed the way you understand an issue or concept

#### **Methods**

The IUPUI Office of Information Management and Institutional Research administered the NSSE survey to freshmen (n = 524) and seniors (n = 998) from February 2012 through the end of the semester and provided the data to CSL in July of the following year. The independent variable, participation in service learning courses, was derived from NSSE survey question 1k:

*In your experience at your institution during the current school year, about how often have you done each of the following?*

- k. Participated in a community-based project (e.g., service learning) as part of a regular course

This independent variable was subsequently recoded from the four item Likert scale (*Very often, Often, Sometimes, Never*) used on NSSE to a dichotomous variable (have or have not participated in service learning courses). As Table 1 illustrates, both freshmen and senior students at IUPUI reported a higher level of participation in service learning courses than other Urban 13 schools, public research institutions, and the NSSE sample (National Survey of Student Engagement, 2012, p. 20).

**Table 1: Participation in Service Learning Courses**

	IUPUI	Urban 13	Public Research	NSSE Sample
<b>Freshmen</b>	<b>56%</b>	<b>38%</b>	<b>38%</b>	<b>41%</b>
<b>Seniors</b>	<b>58%</b>	<b>40%</b>	<b>43%</b>	<b>48%</b>

Percentages are weighted by gender and enrollment status and institutionalize size for comparison

The dependent variable deep learning was comprised of three different scales. Reliability analysis was conducted for higher-order learning ( $\alpha=.83$ ), integrative learning ( $\alpha=.73$ ), and reflective learning ( $\alpha=.83$ ). The data file was then split into freshman and senior students so the analysis could be conducted on these two populations separately.

An independent-samples t-test evaluated differences in reported deep learning skills between students who participated in one or more service learning courses and those students who did not participate in service learning courses. Deep learning skills of higher-order learning, integrative learning, and reflective learning were all higher for both freshmen and seniors who participated in service learning course(s). These results were all statistically significant.

While the independent samples t-test found a significant difference between those who participated in a service learning course and those who did not, it does not indicate the extent of the difference. To overcome this limitation, the effect size was calculated and reported in Tables 2 and 3 below.

**Table 2: IUPUI Freshmen**

Construct	# of Items	Mean (Overall) N=524	Mean (Service Learning) N=305, 58%	Mean (No Service Learning) N=219, 42%	Mean Difference (SL and No SL)	Reliability	Effect Size	Sig.
<b>Higher Order Learning</b>	<b>4</b>	<b>3.05</b>	<b>3.09</b>	<b>2.99</b>	<b>.10</b>	<b>.83</b>	<b>.08</b>	<b>.085</b>
<b>Integrative Learning</b>	<b>5</b>	<b>2.62</b>	<b>2.75</b>	<b>2.43</b>	<b>.32</b>	<b>.73</b>	<b>.27</b>	<b>.000*</b>
<b>Reflective Learning</b>	<b>3</b>	<b>2.72</b>	<b>2.82</b>	<b>2.58</b>	<b>.24</b>	<b>.82</b>	<b>.16</b>	<b>.000*</b>

**Table 3: IUPUI Seniors**

Construct	# of Items	Mean (Overall) N=998	Mean (Service Learning) N=588, 59%	Mean (No Service Learning) N=410, 41%	Mean Difference (SL and No SL)	Reliability	Effect Size	Sig.
<b>Higher Order Learning</b>	<b>4</b>	<b>3.23</b>	<b>3.36</b>	<b>3.03</b>	<b>.33</b>	<b>.86</b>	<b>.24</b>	<b>.000*</b>
<b>Integrative Learning</b>	<b>5</b>	<b>2.81</b>	<b>2.99</b>	<b>2.57</b>	<b>.42</b>	<b>.72</b>	<b>.34</b>	<b>.000*</b>
<b>Reflective Learning</b>	<b>3</b>	<b>2.86</b>	<b>2.96</b>	<b>2.72</b>	<b>.24</b>	<b>.83</b>	<b>.16</b>	<b>.000*</b>

\*p<.05, 2-tailed significance

### Implications

The shift from teaching to learning in higher education has shaped the development of many active learning strategies, including service learning (Tagg, 2003). Deep learning is more likely to occur when students are engaged in a personal way with their learning. Marchese (1997) posits as keys to deep learning: (a) active learning strategies; (b) frequent feedback from others that is provided in non-threatening ways; (c) collaboration; (d) cognitive apprenticeship (i.e., relationship with a mentor with whom students can learn generalization of principles, transfer of knowledge between theory and practice, and analysis of perplexing circumstances); and (e) practical applications in which students are involved in tasks that have consequences but with a safety net for high stakes mistakes. Service learning has many of these qualities of deep learning.

Service learning should be valued to the extent that it contributes to student learning at the course level as well as at the institutional level. These results contribute evidence of student learning at the institution level. These findings are consistent with prior research on participation in service learning and improved student outcome measures (Astin et. al., 2000). Novak, Markey, and Allen's (2007) meta-analysis of nine research studies reports an effect size favoring service-learning that translated into over a 50% advantage on cognitive outcomes for students in service learning courses. These findings provide a rationale for

institutions to support faculty who engage with the community partners to develop service learning courses. For faculty who teach service learning courses, these findings support the value, from an institutional perspective, of the work that they do.

Findings indicate that in comparing students who participated in service learning with those who had not the mean differences between the groups, for both freshmen and seniors, was greatest for integrative learning. According to Price, “service learning promotes transformative, embodied learning...and not only embeds learners in open-ended, unscripted environments but it provides the necessary scaffolding to enable students to increase their capacity for attending to one or more elements of integrative learning” (Price, 2013, p. 1).

Structured reflection is recognized to be a crucial component of good practice in service learning. The inclusion by NSSE of reflective learning as one of the three constructs of deep learning further reinforces the importance of this aspect of a service learning course. Instructors should therefore design reflection activities that incorporate both higher-order learning and integrative learning skills. Whether through structured prompts, digital storytelling, or products within an ePortfolio, it is valuable for reflection activities to be creative, innovative, and build upon prior learning experiences.

### **Limitations of the Findings**

This research was based on a convenience sample of undergraduates from one campus in the Midwest. Self-selection into service learning courses is a potential confounding variable on these results since students may or may not have been aware of the presence of the service learning component when they were selecting courses. Because there was no random assignment, these results - the association between service learning and deep learning - are correlational. No causality can be inferred. Additionally, the self-report nature of the NSSE data and the potential for students' definition of service learning to differ from the researcher's definition are both possible short comings of the findings.

### **Future Research**

Future research should explore these findings across institutional and regional types. Further analysis of NSSE data is also warranted to understand how participation in service learning courses correlates with other engagement variables such as collaborative learning student-faculty interaction, and quality of interactions. Additionally, CSL seeks to collaborate with others in higher education to explore how NSSE data can be used in multi-campus research. Should this type of collaboration be of interest, please contact Tom Hahn, Research Associate, [tomhahn@iupui.edu](mailto:tomhahn@iupui.edu).

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