Experience is a Good Teacher: Integrating Service and Learning in Information Systems Education

Roderick L. Lee
School of Business Administration
The Pennsylvania State University at Harrisburg
Middletown, PA 17057, USA
rlee@psu.edu

ABSTRACT

Over the last decade, the incorporation of service-learning into higher education has grown at an astounding rate. Despite the increase, service-learning remains an under-researched and underexplored pedagogical innovation in information systems education. This study investigates the impacts of service-learning on student learning and development outcomes in a junior-level systems design course. The results confirmed that service-learning had a positive impact on student learning and development along three dimensions: academic learning, interpersonal development, and personal development. The study concludes with implications for research and practice.

Keywords: Service learning, Experiential learning & education, Learning goals & outcomes, Pedagogy

1. INTRODUCTION

> *They could pass examinations and "learn" all this stuff, and not know anything at all.*
>
> *Richard Feynman*

Researchers have long understood that students can recall information learned from lectures and textbook readings, with very little understanding of how to apply what they have learned in real-world settings (Bok, 2006; Eyler and Giles, 1999; Steinke and Fitch, 2007). Lectures and textbook readings do not involve anchors in real-world experience. Service-learning (S-L) has emerged as a process in which students participate in course-relevant community service in order to enhance their learning and development. Students are immediately able to apply what they are learning in concrete, real-world contexts in order to enhance their learning experiences.

For nearly two decades, researchers have consistently reported on the positive consequences of service-learning in undergraduate education. A preponderance of research across a wide range of disciplines has shown that students benefited from the development of practical skills, personal responsibility, interpersonal skills, leadership ability, and citizenship (Eyler and Giles, 1999, 2001; Jacoby, 1996; Toncar et al., 2006).

More recently, interest and support for the integration of service-learning in information systems (IS) education has increased (Alexander, 2001; Guthrie and Navarrete, 2004; Hoxmeier and Lenk, 2003; Johnson and Johnson, 2005; Lawler and Joseph, 2009; Lazar and Lidtke, 2002; Preiser-Houy and Navarrete, 2006, 2011; Wei et al., 2007). Service-learning in IS facilitates students' academic learning, interpersonal development, and personal development (Preiser-Houy and Navarrete, 2006, 2011). In addition, researchers in IS have found that service-learning courses led to higher levels of student interest and motivation (Hoxmeier and Lenk, 2003; Olsen, 2008; Wei et al., 2007).

Despite the increasing popularity and reports of service-learning in IS, service-learning in IS education still remains an emerging pedagogical innovation that is under-researched and underexplored (Johnson and Johnson, 2005; Wei et al., 2007). As a result, there are very few integrated frameworks that capture the scope of benefits that the service-learning experience may provide to students. In addition, very few systematic approaches or methods exist to guide faculty in the design, development, and construction of service-learning projects.

This research develops and tests a multidimensional framework that identifies the impact of service-learning activities on student learning and development outcomes. In addition, this study demonstrates the efficacy of participatory design as a methodology for integrating service-learning into the IS curriculum.

Data from reflection essays and project documentation from a junior-level information systems design course were collected and analyzed. The results confirmed that service-learning had a positive impact on students' learning and development along three dimensions: academic learning, interpersonal development, and personal development. This study concludes with implications for research and practice.

2. BACKGROUND

This section describes the IS program in our department and the organizational design of information systems course

(ODIS). The IS program is situated in an AACSB-accredited School of Business Administration at a branch campus of a major land-grant university in the Northeast. The IS program offers the traditional IS degree and the contemporary information sciences and technology degree (IST). Both degree programs emphasize problem-based learning in team environments. In this research, the focus is on the ODIS course in the IST program.

ODIS is junior-level course that is required by all students in the IST degree program. The course covers interdisciplinary survey topics related to the use and usability of information systems. The curricular goals of the IST program are listed in Table 1. Although ODIS taps each curricular goal, only the items checked are currently slated to be evaluated for assessment.

Goal	Description	ODIS
1	Understand and apply the interdisciplinary, *theoretical knowledge* of the information sciences	
2	Understand, apply, and adapt various *problem-solving strategies*, using appropriate technology and methods	✓
3	*Communicate and work effectively* (both individually and in teams) with a range of perspectives and audiences through a variety of media	
4	Understand professional responsibilities in terms of the ethical, legal, security, and social aspects of any given problem and its solution	✓
5	Commit to the continuous acquisition of relevant knowledge for professional development by self-teaching and/or on-going education and learning	✓

Table 1: IST Curricular Goals

Use The researcher/instructor has been teaching the ODIS course since the 2004/2005 academic year. For the first 4 years, the instructor employed the traditional approach to IS education. Traditional methods included lectures, real-world stories, textbook readings, textbook-based team projects, and project-based coursework on fictitious organizations. Essentially, students worked on "close-ended" problems that had no real-world applicability. In addition, the team project consisted of a final product that was due at the end of the semester.

During the summer prior to the 2008/2009 academic school year, several members of the community expressed an interest in partnering with the university on innovative website design projects. Given the immediacy of the human and community needs, the instructor decided that students might benefit more by working on real-world projects in the local community. As such, the 2008/2009 academic school year marked a new beginning for the ODIS course with the incremental integration of S-L. Unlike the traditional approach, S-L projects are more "open ended" and have been successful in enhancing student learning and development outcomes (Eyler and Giles, 1999; Jacoby, 1996; Preiser-Houy and Navarrete, 2006; Toncar et al., 2006).

3. THEORETICAL BASIS OF SERVICE LEARNING

The theoretical basis of S-L is summarized in this section. This is followed by a summary of the key findings of prior research on S-L in IS and the extant S-L strategies that are currently used in IS education.

3.1 Theoretical Foundation of Service-Learning

Service-learning is "a form of experiential education in which students engage in activities that address human and community needs together with structured opportunities intentionally designed to promote student learning and development. Reflection and reciprocity are key components of service-learning" (Jacoby, 1996, p. 5). From an educational perspective, S-L 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 civic responsibility" (Bringle and Hatcher, 1995, p. 112)

Kolb's (1984) four-stage learning cycle provides the theoretical basis for S-L. The model draws on the interdisciplinary work of John Dewey from educational philosophy, Jean Piaget from developmental psychology, and Kurt Lewin from social psychology (Eyler and Giles, 1999; Johnson and Johnson, 2005; McEwen, 1996; Petkus, 2000). Kolb's model describes a four-stage continuous learning progression: *concrete experience*, *reflective observation*, *abstract conceptualization*, and *active experimentation* (see Figure 1).

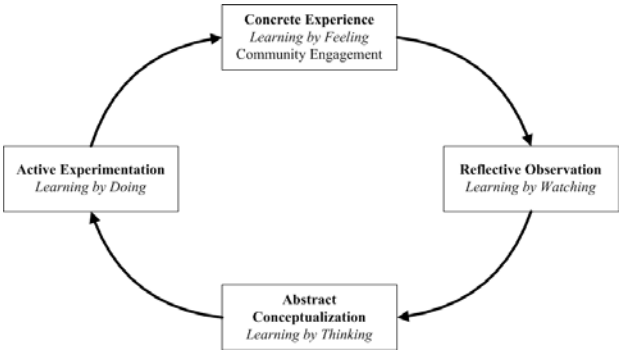

Figure 1: Kolb's Learning Cycle

Concrete experience is the feeling phase that involves the sensory and emotional engagement in some activity. Concrete experience materializes when the student is involved in meaningful community service that facilitates emotional intensity, attachment, and a high level of involvement. The next phase, reflective observation, involves watching, listening, recording, discussing, and elaborating on the experience. Reflective observation occurs when the student reflects on his or her own experience or with others who are involved in the S-L activity.

Abstract conceptualization is characterized as the in-depth thinking phase that involves integrating course-relevant theories and concepts into the overall learning

experience. Reflection serves as the link between the concrete experience and abstract conceptualization phases. Finally, active experimentation is the doing phase in which the student applies the course concepts and theories to a concrete, real-world situation. Learning in this final phase occurs through an iterative, trial-and-error process.

Hoxmeier and Lenk (2003) discuss two general implications of Kolb's learning cycle for S-L in IS education. First, there is no designated starting point. However, in order for effective learning to occur, students must complete the entire cycle. Second, most traditional IS course methodologies only involve abstract conceptualization (e.g., textbook reading and lectures) and some active experimentation (e.g., testing/projects). The two phases missing are concrete experience and reflective observation. S-L embraces all four cycles of learning and is consistent with the curricular goals listed in Table 1. Equally important, S-L accommodates students with various learning styles (Jacoby, 1996; Kolb, 1984).

3.2 Research Support for Service-Learning Integration in IS Education

Although the efficacy of integrating S-L into IS education was encouraged over a decade ago (Alexander, 2001), there remains a paucity of empirical research on S-L in IS (Johnson and Johnson, 2005; Wei et al., 2007). Indeed, a review of the literature revealed very few studies in IS that have reported on a specific S-L strategy and student learning and development outcomes (see Table 2).

Hoxmeier and Lenk (2003) were among the first researchers in IS to demonstrate the efficacy of S-L in the systems design and development domain. The researchers employed the consultative model of S-L (Kenworthy-U'Ren, 1999, 2000). Results revealed that the integrated approach facilitated the acquisition of technical knowledge, project management skills, interpersonal communication skills, and social skills. This inaugural study concluded with best practices for implementing S-L in IS. However, after 8 years, Google Scholar revealed only 20 citation counts as of September 2011.

Wilcox and Zigurs (2003) reviewed the extant information systems design methodologies and derived an agile S-L methodology specifically for the information system design and development domain. Their model defined a complete set of phases and associated techniques, deliverables, and roles. The phases consisted of project investigation, project initiation and analysis, DEW Loop (e.g., dedicate, execute, and weigh feedback), and final reflections. This integrated model provided early support for the use of design methodologies as a strategy to facilitate the development and implementation of S-L courses in IS.

Additionally, Wilcox and Zigurs (2003) conducted an in-depth review of the literature on S-L and identified nine critical success factors. These critical success factors include the following: (1) reflection or feedback, (2) grading on actual learning, (3) reflection by all stakeholders, (4) careful project selection, (5) relevance of the project to the intended academic program, (6) partnership between stakeholders, (7) optional involvement, (8) balance of interest of all stakeholders, and (9) careful selection of stakeholders. However, after 8 years, Google Scholar revealed only eight citation counts.

Rose and colleagues (Rose et al., 2005) examined the impact of S-L on student learning and development in a graduate accounting information systems course. The course covered systems design and development topics. Similar to Hoxmeier and Lenk (2003), the researchers employed the consultative model of S-L (Kenworthy-U'Ren, 1999, 2000). Students reported an increase in course satisfaction, improved perceptions of ability, improved self-confidence in their chosen career, increased desire to study accounting information systems, and improved performance on complex data modeling tasks. However, after 6 years, Google Scholar revealed only 13 citation counts.

Preiser-Houy and Navarrete (2006) explored the efficacy of using community-based research (CBR) as a S-L strategy in IS education. CBR is a transformative form of S-L (Strand et al., 2003). A CBR strategy emphasizes the reciprocal benefits of student learning and social change in the community.

Preiser-Houy and Navarrete (Preiser-Houy and Navarrete, 2006) conducted an intense case study on the impacts of S-L on multidimensional student learning outcomes. The results revealed that S-L facilitated academic learning (e.g., domain specific and general academic), personal development (e.g., self-knowledge and self-efficacy), and interpersonal development (e.g., communication, collaboration, and leadership skills). However, after 5 years, Google Scholar revealed only seven citation counts.

Researchers	S-L Strategy	Domain	Citations
Hoxmeier and Lenk (2003)	Consultative Model	Systems Design and Development	20
Wilcox and Zigurs (2003)	Agile Development	Systems Design and Development	8
Rose, Rose, and Norman (2005)	Consultative Model	Accounting Information Systems	13
Preiser-Houy and Navarrete (2006)	Community-Based Research	IS Web Development	7
Wei, Siow, and Burley (2007)	Program Design	Information Management and Technology	11

Table 2: Studies Reporting on the S-L Strategy and Outcomes in IS

Finally, Wei, et al. (2007) employed a structured program design approach in a capstone course on information systems and technology management. Their strategy consisted of structured project deliverables and milestones in order to guide the implementation of S-L. The results revealed that students exhibited a higher motivation to study in the S-L course than in a traditional course. After 4 years, Google Scholar reveals only 11 citation counts.

In summary, the literature review reveals that S-L has been implemented in a variety of ways in IS education. However, there are few systematic approaches to assess student learning and development outcomes in IS education. Furthermore, the literature review provided support for various S-L strategies such as the consultative, CBR, and agile development. However, only one strategy integrated the systems development life cycle (Wilcox and Zigurs, 2003).

4. SERVICE-LEARNING FRAMEWORK AND PROPOSITIONS

In this section, previous research is synthesized in order to develop an integrated conceptual framework along with a series of propositions. Propositions are defined as hypothetical stories about why acts, events, and structures occur (Sutton and Staw, 1995). These propositions combine to form a theoretical pattern that is illustrated in the S-L input-process-output (or I-P-O) model (see Figure 2).

Four facets of S-L learning serve as the inputs in the I-P-O model: structured reflection, structured reciprocity, placement quality, and meaningful application (Eyler and Giles, 1999; Jacoby, 1996; Toncar et al., 2006). The learning processes include all four stages in Kolb's learning cycles model (Hoxmeier and Lenk, 2003; Kolb, 1984). Finally, the outputs consist of three dimensions of student learning and development: academic learning, interpersonal development, and personal development (Eyler and Giles, 1999; Preiser-Houy and Navarrete, 2006).

4.1 Outcomes: Student Learning and Development

A review of the research on S-L and student learning and development reveals three primary dimensions of student learning and development: (1) academic learning; (2) interpersonal development; and (3) personal development (Eyler and Giles, 1999; Preiser-Houy and Navarrete, 2006).

Academic learning is a central goal of a college education. However, Eyler and Giles (1999) highlighted the importance of linking academic learning with interpersonal and personal development. Therefore, academic learning serves as the link between interpersonal development and personal development in the I-P-O model.

Academic learning is defined as the cognitive competencies including domain-specific and general academic knowledge and skills. Interpersonal development consists of the affective competencies such as communication skills, teamwork skills, and leadership skills. Finally, personal development consists of personal efficacy, self-knowledge, and career development.

4.2 Service-Learning Components: Structured Reflection and Structured Reciprocity

From an educational perspective, Jacoby (Jacoby, 1996) identified two important components of a high quality S-L experience: structured reflection and structured reciprocity.

4.2.1 Structured Reflection: The first central element of S-L is structured reflection (Bringle and Hatcher, 1996; Butin, 2010; Jacoby, 1996; Wilcox and Zigurs, 2003). Reflection is defined as "the intentional consideration of an experience in light of particular learning objectives" (Hatcher and Bringle, 1997, p. 153). Researchers generally refer to reflection as the hyphen in S-L (Eyler and Giles, 1999). Structured reflection,

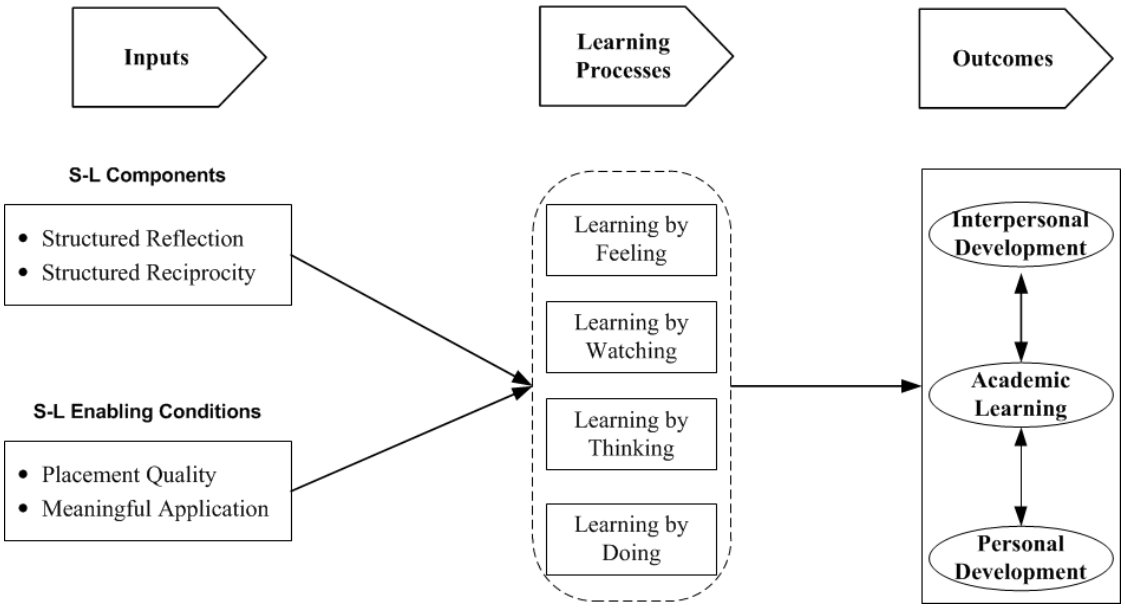

Figure 2: Service-Learning I-P-O Model

however, is defined as the extent to which reflective activities are guided, occur regularly, and link the service experience to program learning objectives. For example, structured reflection facilitates learning by feeling and learning by thinking through learning by watching (Kolb, 1984).

Prior research has demonstrated that the quantity and quality of reflection – written and discussion – had a modest but significant impact on students' academic learning and personal development (Eyler and Giles, 1999). Similarly, Mabry (1998) reported that the frequency and variety of reflective activities enhances students' civic and academic outcomes.

Written reflection primarily consists of reflection journals, papers, and essays. However, project documentation is a form of written reflection in the systems design and development domain. Written reflection enables students to think more clearly and process the service experience. More importantly, written reflection provides a permanent record of the S-L process.

Discussion reflection primarily consists of structured class discussions and presentations. This form of reflection is more flexible because it can occur formally in class or informally with student peers, community members, friends, and faculty. Discussion reflection provides a forum to air out the ambiguity and complexity of the ill-structured tasks associated with systems design and development activities. Furthermore, discussion with the faculty member provides a forum for emotional support (Astin et al., 2000). Therefore, it is posited that structured reflection is positively related to academic learning and personal development.

Proposition 1a: Structured reflection has a positive impact on students' academic learning.

Proposition 1b: Structured reflection has a positive impact on students' personal development.

4.2.1 Structured Reciprocity

The second central element of S-L is reciprocity (Butin, 2010; Jacoby, 1996). Through reciprocity, students do things with others rather than for them (Jacoby, 1996). Structured reciprocity is defined as the extent to which both the students and community partners benefit from the service experience. While students benefit from learning and development, the community partner should benefit from empowerment (i.e., the ability to take control of their own future) and the broader community should benefit as well. In this model, structured reciprocity emphasizes reciprocal learning, mutual collaboration, and community empowerment. Therefore, it is posited that structured reciprocity enhances students' interpersonal development and personal development.

Proposition 2a: Structured reciprocity has a positive impact on students' interpersonal development.

Proposition 2b: Structured reciprocity has a positive impact on students' personal development.

4.3 S-L Enabling Conditions

While structured reflection and structured reciprocity are the two central components of a high-quality S-L experience, there are two preconditions that influence the success of S-L: placement quality and meaningful application.

4.3.1 S-L Placement Quality: Placement quality describes the setting for the learning in the S-L experience. Placement quality is defined as the extent to which students can work on challenging tasks, exercise initiative, and have important responsibilities (Eyler and Giles, 1999). High quality placements facilitate learning by feeling.

Researchers have found that placement quality is significantly associated with interpersonal and personal development (Eyler and Giles, 1999). According to developmental theorists, challenging tasks create the conditions for development to occur by upsetting the existing psychological equilibrium within the learner (McEwen, 1996). These challenges provide the opportunity for students to take on more important responsibilities and exercise initiative.

Studies have also shown that the context facilitates emotional intensity, attachment, and a high level of student involvement (Hoxmeier and Lenk, 2003). Student involvement refers to "the amount of physical and psychological energy that the student devotes to the academic experience" (Astin, 1999, p. 518). Therefore, students learn more because involvement in S-L is more motivating for students (Eyler and Giles, 1999). Therefore, it is posited that placement quality is positively related to academic learning, interpersonal development, and personal development.

Proposition 3a: Placement quality has a positive impact on students' academic learning.

Proposition 3b: Placement quality has a positive impact on students' interpersonal development.

Proposition 3c: Placement quality has a positive impact on students' personal development.

4.3.2 Meaningful Application: The relevance of the project to the intended course has been identified as a critical success factor for S-L success (Butin, 2010; Wilcox and Zigurs, 2003). Meaningful application is defined as the degree to which the service experience is related to the course content and specific learning objectives (Eyler and Giles, 1999; Hoxmeier and Lenk, 2003). Meaningful application facilitates learning by thinking and learning by doing.

Studies have shown that meaningful application is strongly associated with students' academic learning outcomes, such as deeper understanding of the subject matter and critical thinking skills (Eyler and Giles, 1999). Meaningful application also facilitates students' belief that they made a difference in the community. Therefore, meaningful application has a positive impact on students' academic learning and personal development.

Proposition 4a: Meaningful application has a positive impact on students' academic learning.

Proposition 4b: Meaningful application has a positive impact on students' personal development.

5. RESEARCH METHODOLOGY

The purpose of this study was to investigate the student learning and development outcomes in a service-learning course. Drawing on the work of Rama et al. (2000), a content analysis of student writings was chosen as the research methodology. Content analysis is a methodology used in the social sciences to study the content of human communications (Krippendorff, 2004). A content analysis involves categorizing the data and then calculating the frequency of category occurrences.

5.2 Data Collection

Data were collected from September 2011 – November 2011. Following the work of Guthrie and Navarrete (2004), data were primarily obtained from reflection essays on the students' perceptions of the service-learning experience. First, a post-course reflections essay along with a copy of the curricular goals was emailed to a convenience sample of 10 students who had previously completed the course from 2008 - 2010. All of these students were gainfully employed in the IT workforce. Six of the students responded. Similarly, a mid-course reflections essay along with a copy of the curricular goals was administered to all 18 students who were enrolled in the course during the fall 2011 semester. Fifteen students completed the essay.

The reflections essay was divided into four sections: (1) background information; (2) description of the service activities; (3) analysis of how the service related to the course material; and (4) application to their learning and development. The essays were supplemented with observation of the project as it unfolded and a review of the project documentation.

5.3 S-L Design Methodology

As previously stated, only one approach integrated S-L and systems development approaches (Wilcox and Zigurs, 2003). However, the field of IS has a long history of using various design methodologies for systems development projects. An IS design methodology refers to "a codified set of goal oriented 'procedures' which are intended to guide the work and cooperation of the various parties (stakeholders) involved in the development of an IS application" (Iivari and Hirschheim, 1996, p. 560).

This research utilized a participatory design methodology (PD) to facilitate the integration of S-L in the ODIS course (Spinuzzi, 2005). PD is defined as a diverse set of principles and practices aimed at designing information systems, applications, and infrastructures in which designers and users work together in mutually beneficial ways (Greenbaum and Kyng, 1991; Schuler and Namioka, 1993). A central tenet of PD is that users who will ultimately experience the benefits and risks in design are entitled to have a voice in the design process (Greenbaum and Kyng, 1991; Lee and Carroll, 2010; Merkel et al., 2004; Muller et al., 1997).

PD is based on the Marxist commitment of democratically empowering workers and fostering democracy. Empowerment, which is a form of self-actualization, is based on two dimensions: functional empowerment and democratic empowerment. Functional empowerment (i.e., change management) relates to the users' ability to pursue their activities with greater ease. Democratic empowerment (i.e., change outcome) relates to the socio-technical competencies that users acquire through their direct participation in the development process. Functional and democratic empowerment is enhanced through structured activities that facilitate structured reciprocity.

Overall, PD requires a high level of user participation throughout the process. User participation is posited to result in systems success based on three theoretical explanations: (1) the creation of psychological buy-in among participants; (2) the improvement of systems quality by getting the requirements right; and (3) the emergence of relationships among developers and users that shape development outcomes (Markus and Mao, 2004).

5.4 The Participatory Design Process

Over the course of the 15-week semester, students had structured milestones and deliverables associated with their project. The participatory design projects were primarily based on the four basic activities of the life cycle model that was emphasized in the course textbook (Rogers et al., 2011). The four basic activities consisted of the following: (1) establishing requirements, (2) designing alternatives, (3) prototyping, and (4) evaluating. In order to complement S-L, a problem space assignment was added to the beginning of the project, and a final reflection was added to the end of the project.

The problem space consists of four objectives: (1) gain an initial understanding of the community problem to be solved; (2) articulate the problem space; (3) document the students' assumptions and claims, and (4) create a project plan. Once students articulated the community problem, they then reflected on why they thought there were problems with the existing system or user experience. Next, students reflected on how they thought an innovative website could change the existing situation in order to better support the mission and goals of the organization. Afterwards, students explicated their assumptions and claims through an iterative and reflective process. Finally, the students developed a project plan that consisted of the phases and project deliverables associated with the course syllabus.

The objectives of establishing requirements activities are threefold: (1) identify and document the characteristics of the target users; (2) gain a detailed understanding and document the problem to be solved and the tasks to be supported by the user interface; and (3) gain an in-depth understanding and document the community partner's functional and nonfunctional requirements for the system. This phase of the project was conducted in close collaboration with the community partner.

Students were required to identify the community partner's primary tasks and develop a hierarchical task analysis for each task. The task analysis enabled the students to reflect and envision ways that an interactive website could support and extend the current ways that the tasks were being performed. This phase concluded with the documentation of a stable set of requirements.

The aim of designing alternatives is to generate alternative solutions to the problem. Designing alternatives

consist of two sub-activities: conceptual design and physical design. The goal of conceptual design consists of producing a conceptual model for the system, whereas the goal of physical design involves developing alternatives for the details of the system that meets the user's requirements. Reflective activities such as index-card prototyping, group discussions, and project documentation facilitated the selection of an optimal solution.

The aim of the next phase, prototyping, is developing alternative designs so that they can be communicated and assessed. The students developed low- and high-fidelity prototypes. Low-fidelity prototyping consisted of the development of index-card prototypes. Through critical reflection, the students were better prepared to develop high-fidelity prototypes that evolved into the final product. As emphasized in the course textbook, the activity of developing prototypes encourages reflection throughout the design process (Rogers et al., 2011).

Evaluation occurs throughout the process and is aimed at determining if the system meets the needs of the users, and determining the usability and acceptability of the design. The last phase consists of final reflections. Students are required to reflect on their experience. Structured reflection consisted of written and discussion reflection. Written reflection consisted of documentation that was submitted for a grade at each stage of the project. Discussion reflection consisted of group presentations at each phase. After each presentation, the students discussed their experiences and received feedback from the instructor and the class. The process concluded with a post-course reflections essay on the students' perception of the S-L experience.

5.5 Dependent Construct Measurement

The perception of student learning and development was measured by three dependent variables: academic learning, interpersonal development, and personal development.

5.5.1 Academic Learning: Academic learning is defined as the extent to which the students acquired domain-specific and general academic knowledge and skills. The domain category includes the broader understanding and application of the interdisciplinary theoretical knowledge of the information sciences (See Leaning Goal 1, Table 1). Core topics included the system development life cycle; usability; user-centered design; evaluation; and the cognitive, emotional, and social aspects of systems design.

The general learning category includes critical thinking and lifelong learning skills. Critical thinking skills are developed as students apply and adapt various problem solving strategies (see Learning Goal 2, Table 1). Finally, lifelong learning occurs through the students' commitment to the continuous acquisition of relevant knowledge for professional development by self-teaching. Each document was content analyzed for evidence that demonstrated the acquisition of domain-specific and general academic learning.

5.5.2 Interpersonal Development: Interpersonal development includes communication and the ability to work effectively with others (see Learning Goal 3, Table 1). Leadership skills were added as an additional interpersonal development outcome. Therefore, the documents were content analyzed for evidence demonstrating the acquisition of communication, collaboration, and leadership skills.

5.5.3 Personal Development: The personal dimension includes personal efficacy, self-knowledge, and career development. Personal efficacy develops when the students realize that their skills and knowledge can make a difference in the community. Self-knowledge occurs when the students understand themselves better by gaining an understanding of their strengths and weaknesses.

Finally, career development is defined as the extent to which the service experience provides skills and experience that the students now find valuable in their careers (see Learning Goal 4, Table 1).

6. ANALYSIS AND RESULTS

This study relied on an a priori conceptual framework and propositions in order to guide the data analysis. This research used a modified version of Guthrie and Navarrete's (2004) instrument (see Appendix). The data was content analyzed and placed in five categories: (1) perception of service learning; (2) perception of user-centered design; (3) perception of academic learning; (4) perception of interpersonal development; and (5) perception of personal development. The results were recorded on a 5-point scale of 1 through 5, with 1 being negative. Table 3 shows the mean ratings of the post- and mid-course essays.

Construct	Post-Course	Mid-Course
Service-Learning	5.00	4.80
User-Centered Design	4.50	4.53
Academic Learning	4.39	3.84
Interpersonal Development	4.33	4.02
Personal Development	4.00	3.64

Table 3: Mean Post- and Mid-Course Ratings

6.1 Perceptions of Service-Learning

The ratings from the reflections essays (mean rating: 5.00 post, 4.80 mid) indicated that students held overwhelmingly positive perceptions of S-L. Post-course essays provide evidence that students found the S-L experience to be one of their best experiences in college. For example, one student reported "Taking IST 331 was one of the best experiences I had at [university], and the memories, community-ties, and personal growth and accomplishment will last a lifetime."

The majority of students noted the difference between traditional pedagogical practices and S-L. One student commented, "Rather than merely being lectured at, we were quickly drawn into the worlds of project management, software development, and customer relations." Another noted, "This course was different from other courses because the course was based on a real- world project rather than just lecture-based learning. This allowed us to have interaction

with a stakeholder instead of being given an example and then learning how to go through hypothetical phases."

Although the results were slightly higher for the post-course essays, students currently enrolled in the course also held positive perceptions of S-L For example, one student commented, "One of the main reasons why I like this course is the ability to relate what we learn in class to the homework or to the service project. This relationship allows for the information to be presented more than once, which makes it all the much easier to retain."

6.2 Perceptions of User-Centered Design

The post- and mid-course essay ratings (mean rating: 4.50 post, 4.53 mid) show that students had positive perceptions of user-centered design. Working with real stakeholders was a positive experience for both groups of students. For example, one student commented on the post-course essay, "What made this assignment more enticing over other class work was the opportunity to interact with a real customer who had real requirements, in an academic setting that had real deadlines." Another noted, "User-centered design is very important because the users are ultimately the ones who are going to be using the system. If you just design based around the system, you will lose track of the user's original needs."

There was no significant difference in the mean ratings on the post- and mid-course reflections essays. For example, a student reported on the mid-course essay that "user-centered design is helpful because if the design is done correctly then there will be less time and resources put into fixing the design."

6.3 Perceptions of Academic Learning

The ratings of the post- and mid-course essays (mean rating: 4.39 post, 3.84 mid) show that students who had already completed the course held higher positive perceptions of the benefit to their academic learning. For example, a student in the post-course sample noted, "This project allowed us to hone our software development and project management techniques in ways that multiple choice and essay questions never could. The requirements gathering, documentation, team management, development, testing and delivery were not merely theoretical 'what-ifs,' but rather real-life experiments with a profound impact on a local family."

Another student noted, "Since the phases correspond to the course lessons, students gain a full understanding of the concepts, skills, and documentation that are associated with the SDLC. Time management skills are learned naturally by balancing a full course load, an internship, and a real-world project, and critical thinking skills are put to the test when the unexpected happens." Similarly, another student noted, "I would say all of the phases had a positive impact on my academic learning. I could not imagine any IT course not using a service project as a learning tool."

As indicated, students that completed the mid-course essays held slightly lower perceptions of the contribution of S-L to their academic learning. One student noted, "The service experience allowed me to work directly with a client and use my problem solving skills to compromise between different ideas and what we can actually do with the website given the time constraint for completion." Another student commented, "To be honest with you, coming into this class I thought I was going to learn how to make a website better. Since then my perception has changed a little bit. Now that I've learned that there is a structured way to design not only software and webpages but any product at all."

6.4 Perceptions of Interpersonal Development

The ratings from the post- and mid-course essays (mean rating: 4.33 post, 4.02 mid) demonstrate that students in both groups held positive perceptions regarding the contribution of S-L to their interpersonal development. For example, one student from the post-course sample noted, "Without the daily communication, we would have done what most groups had to do and that was redoing everything." Another indicated, "Aside from the technical aspects of this course, IST 331 also strengthens students' soft skills, which is the key to a successful career in any field. The development of communication skills, both written and oral, is driven by the deliverables for the project: written documentation and oral presentations."

Students from the mid-course sample appear to be undergoing team development challenges that are associated with the development sequence of small groups (Tuckman, 1965; Tuckman and Jensen, 1977). For example, one student commented, "We had trouble communicating with one another and getting information between each other. We have since gotten that fixed and easily communicate and keep in contact." Another student commented, "It has helped me grow as a team member. I have also gained additional communication skills. I have gained a lot of experience working as a team and learning how to allocate tasks and work efficiently and effectively." Finally, another student commented on leadership skills: "For a couple of the phases I have been tasked with dividing the work up amongst our group and setting deadlines for each part to ensure that we have time to bring everything together for the presentations and papers for the different phases."

6.5 Perceptions of Personal Development

The ratings from the post- and mid-course essays (mean rating: 4.00 post, 3.64 mid) show that students who had already completed the course held higher perceptions toward the benefit to their personal development. For example, a student commented on the contribution to his career development: "Not only was this class beneficial in the classroom, but it tremendously prepared me for the real world. Currently, I am with the Department of Defense as an IT Specialist (Web Application Developer). This project/course has given me a whole new mindset. Each and every day, I work closely with customers from all across the world in developing applications that support our military overseas. Just like I did in IST 331, from phase 1 of the project to the end, everything is customer driven and focused." Similarly, another student commented, "I believe this gave us a head start with our career because it gave us experience working with a client." Finally, students reported on the contribution to their self-knowledge. For example, one student commented, "Personally the project helped me figure out how to work with others and find my strengths while working in a team."

The mid-course group held lower perceptions of personal development. However, the results were still positive. One student noted, "This project is a start where I can look back and say I did good on this and I could of did better on that, that will prepare myself for more and better opportunities to come." In terms of self-knowledge, a student commented, "I think I'm improving in my presentation skills. I am less nervous and a little more confident each time." Finally, another student commented, "Given my experience working in corporate IT through internships I think that classes like IST 331 working with real clients better helps prepare me for my career as the projects now have the factors of outside people where the project scope and goals change as the clients wants and needs change versus just a problem that is assigned in class."

Students in the mid-course sample also noted the contribution to their interviews. For example, one student noted, "At an interview the other day, this project and others were some of the main talking points for what I had to say. It was great to be able to reply to questions about my background with instances of actual applicable experiences rather than just saying I learned about it."

7. CONCLUSIONS

This paper examined the impact of S-L on student learning and development outcomes in a junior-level information systems design course. The findings confirm prior research that suggests that S-L projects that include structured reflection, structured reciprocity, good community placements, and meaningful application enhance student learning and development (Eyler and Giles, 1999). This study also demonstrated the successful implementation of service-learning using participatory design as an alternative methodology to facilitate the development and implementation of S-L courses in IS. A PD approach to S-L enables students to immediately apply classroom learning to the design and development of community-led website design and development projects.

While the results confirm prior research, this study was limited on three fronts. First, the study was limited due to selection bias and small sample size. Second, no data were collected on the characteristics of the students. Finally, the results relied on qualitative data analysis. Despite these limitations, the results of this study should stimulate a productive national dialogue on the efficacy of integrating S-L in IS education.

7.1 Implications for Research

This study reported only on the outcomes of S-L. While the determinants were explicated in the I-P-O model: structured reflection – structured reciprocity, placement quality, and meaningful application – research is needed in order to identify the correlations between the determinants and outcomes. In addition, more research is needed in order to identify the relationship between the characteristics of students, such as their disposition toward service, learning style, and level of cognitive development to their perceptions of the learning and development outcomes. Finally, more research is needed that uses survey data in order to produce more objective quantitative analysis of the data.

7.2 Implications for Practice

This study identifies three important implications for practice. First, participatory design provides a structured methodology for integrating S-L in IS education. PD facilitates structured program deliverables and milestones throughout the semester. Second, documentation of system design and development projects can be used in lieu of reflection journals and reflection papers. Finally, the I-P-O model can be used to assess the service-learning experience over the course of the semester.

8. REFERENCES

Alexander, R.A. 2001. "Need to Update Your Information Technology? Try Service Learning." Nonprofit World, Vol. 19, No. 5, pp. 27 - 29.

Astin, A.W. 1999. "Student Involvement: A Developmental Theory for Higher Education." Journal of College Student Development, Vol. 40, No. 5, pp. 518 - 529.

Astin, A.W., Vogelgesang, L.J., Ikeda, E.K., and Yee, J.A. (2000). How Service Learning Affects Students. Higher Education Research Institute: Los Angeles, CA.

Bok, D.C. (2006). Our Underachieving Colleges: A Candid Look at How Much Students Learn and Why They Should Be Learning More. Princeton University Press: Princeton, NJ.

Bringle, R.G., and Hatcher, J.A. 1995. "A Service-Learning Curriculum for Faculty." Michigan Journal of Community Service Learning Vol. 2, No. 3, pp. 112 - 122.

Bringle, R.G., and Hatcher, J.A. 1996. "Implementing Service Learning in Higher Education." Journal of Higher Education, Vol. 67, No. 2, pp. 221 - 239

Butin, D.W. (2010). Service-Learning in Theory and Practice: The Future of Community Engagement in Higher Education. Palgrave Macmillan: New York, NY.

Eyler, J., and Giles, D.E. (1999). Where's the Learning in Service-Learning? Jossey-Bass: San Francisco, CA.

Eyler, J., and Giles, D.E. 2001. "At a Glance: What We Know About the Effects of Service-Learning on College Students, Faculty, Institutions and Communities, 1993-2000," Corporation for National and Community Service: Washington, DC, pp. 1 - 121.

Feynman, R. P. (1985). "Surely you're joking, Mr. Feynman": Adventures of a curious character. New York, NY: W.W. Norton.

Greenbaum, J., and Kyng, M. (1991). Design at Work: Cooperative Design of Computer Systems. Lawrence Erlbaum Associations: Hillsdale, NJ.

Guthrie, R.A., and Navarrete, C.J. 2004. "Service-Learning Impact on Is Students in a Web Development Course." Information Systems Education Journal, Vol. 2, No. 12, pp. 3 - 12.

Hatcher, J.A., and Bringle, R.G. 1997. "Reflection: Bridging the Gap between Service and Learning." College Teaching Vol. 45, No. 4, pp. 153 - 158

Hoxmeier, J., and Lenk, M.M. 2003. "Service-Learning in Information Systems Courses: Community Projects That Make a Difference." Journal of Information Systems Education, Vol. 14, No. 1, pp. 91 - 100.

Iivari, J., and Hirschheim, R. 1996. "Analyzing Information Systems Development: A Comparison and Analysis of

Eight Is Development Approaches." Information Systems, Vol. 21, No. 7, pp. 551 - 575

Jacoby, B. (1996). Service-Learning in Higher Education: Concepts and Practices. Jossey-Bass: San Francisco, CA.

Johnson, R.D., and Johnson, P.H. 2005. "Service Learning in Is: Teaming with Community and Industry." Proceedings of the Ninth Pacific Asia Conference on Information Systems, Bangkok, Thailand, July 7 - 10, pp. 1185 - 1191.

Kenworthy-U'Ren, A.L. 1999. "Management Students as Consultants: An Alternative Perspective on the Service-Learning "Call to Action"." Journal of Management Inquiry, Vol. 8, No. 4, pp. 379 - 387.

Kenworthy-U'Ren, A.L. 2000. "Management Students as Consultants: A Strategy for Service-Learning in Management Education," in P.C. Godfrey and E.T. Grasso (eds.) Working for the Common Good: Concepts and Models for Service-Learning in Management, American Association for Higher Education: Washington, DC, pp. 55 - 67.

Kolb, D.A. (1984). Experiential Learning: Experience as the Source of Learning and Development. Prentice-Hall: Englewood Cliffs, NJ.

Krippendorff, K. (2004). Content Analysis: An Introduction to Its Methodology. Sage: Thousand Oaks, CA.

Lawler, J.P., and Joseph, A. 2009. "Expanding Flexible Models of Service Learning in Information Systems Curricula." Information Systems Education Journal, Vol. 7, No. 95, pp. 3 - 24.

Lazar, J., and Lidtke, D. 2002. "Service-Learning Partnerships in the Information Systems Curriculum," in J. Lazar (ed.) Managing It/Community Partnerships in the 21st Century Idea Group: Hershey, PA, pp. 1-16.

Lee, R.L., and Carroll, J.M. 2010. "Towards a Framework for Effective User Participation in Nonprofit Community Contexts: Beyond User Involvement." Proceedings of the Southern Association for Information Systems Atlanta, GA, pp. 13 - 18.

Mabry, J.B. 1998. "Pedagogical Variations in Service-Learning and Student Outcomes: How Time, Contact, and Reflection Matter." Michigan Journal of Community Service Learning, Vol. 5, No., pp. 32 - 47.

Markus, M.L., and Mao, J.-Y. 2004. "Participation in Development and Implementation: Updating an Old, Tired Concept for Today's Is Contexts." Journal of the Association for Information Systems, Vol. 5, No. 11-12, pp. 514 - 544.

McEwen, M.K. 1996. "Enhancing Student Learning and Development through Service-Learning," in B. Jacoby (ed.) Service-Learning in Higher Education: Concepts and Practices, Jossey-Bass: San Francisco, CA, pp. 53 - 91.

Merkel, C.B., Xiao, L., Farooq, U., Ganoe, C.H., Lee, R.L., Carroll, J.M., and Rosson, M.B. 2004. "Participatory Design in Community Computing Contexts: Tales from the Field." Proceedings of the Eighth Biennial Participatory Design Conference, Toronto, Canada, July 27 - 31, 2004, pp. 1 - 10.

Muller, M.J., Haslwanter, J.H., and Dayton, T. 1997. "Participatory Practices in the Software Lifecycle," in M.G. Helander, T.K. Landauer and P.V. Prabhu (eds.) Handbook of Human-Computer Interaction, Elsevier: Amsterdam, pp. 255 - 297.

Olsen, A.L. 2008. "A Service Learning Project for a Software Engineering Course." Journal of Computing Sciences in Colleges, Vol. 24, No. 2, pp. 130 - 136.

Petkus, E. 2000. "A Theoretical and Practical Framework for Service-Learning in Marketing: Kolb's Experiential Learning Cycle." Journal of Marketing Education, Vol. 22, No. 1, pp. 64 - 70

Preiser-Houy, L., and Navarrete, C.J. 2006. "Exploring the Learning in Service-Learning: A Case of a Community-Based Research Project in Web-Based Systems Development." Journal of Information Systems Education, Vol. 17, No. 3, pp. 273 - 284.

Preiser-Houy, L., and Navarrete, C.J. 2011. "A Community-Based Research Approach to Develop an Educational Web Portal." Information Systems Education Journal, Vol. 9, No. 1, pp. 4 - 13.

Rama, D.V., Ravenscroft, S.P., Wolcott, S.K., and Zlotkowski, E. 2000. "Service-Learning Outcomes: Guidelines for Educators and Researchers." Issues in Accounting Education, Vol. 15, No. 4, pp. 657 - 692.

Rogers, Y., Sharp, H., and Preece, J. (2011). Interaction Design: Beyond Human-Computer Interaction (3 ed.). John Wiley & Sons: New York.

Rose, J.M., Rose, A.M., and Norman, C.S. 2005. "A Service-Learning Course in Accounting Information Systems." Journal of Information Systems, Vol. 19, No. 2, pp. 145 - 172.

Schuler, D., and Namioka, A. (1993). Participatory Design: Principles and Practices. Lawrence Erlbaum Associations: Hillsdale, NJ.

Spinuzzi, C. 2005. "The Methodology of Participatory Design." Technical Communication, Vol. 52, No. 2, pp. 163 - 174.

Steinke, P., and Fitch, P. 2007. "Assessing Service-Learning." Research & Practice in Assessment, Vol. 1, No. 2, pp. 1 - 8.

Strand, K., Marullo, S., Cutforth, N., Stoecker, R., and Donohue, P. (2003). Community-Based Research and Higher Education: Principles and Practices. Jossey-Bass: San Francisco, CA.

Sutton, R.I., and Staw, B.M. 1995. "What Theory Is Not." Administrative Science Quarterly, Vol. 40, No. 3, pp. 371 - 384.

Toncar, M.F., Reid, J.S., Burns, D.J., Anderson, C.E., and Nguyen, H.P. 2006. "Uniform Assessment of the Benefits of Service Learning: The Development, Evaluation, and Implementation of the Seleb Scale." The Journal of Marketing Theory and Practice Vol. 14, No. 3, pp. 223 - 238

Tuckman, B.W. 1965. "Developmental Sequence in Small Groups." Psychological Bulletin, Vol. 63, No. 6, pp. 384 - 399.

Tuckman, B.W., and Jensen, M.A.C. 1977. "Stages of Small-Group Development Revisited." Group & Organization Management, Vol. 2, No. 4, pp. 419 - 427.

Wei, K., Siow, J., and Burley, D.L. 2007. "Implementing Service-Learning to the Information Systems and Technology Management Program: A Study of an Undergraduate Capstone Course." Journal of Information Systems Education, Vol. 18, No. 1, pp. 125 - 136.

Wilcox, E., and Zigurs, I. 2003. "A Method for Enhancing the Success of Service-Learning Projects in Information Systems " Information Systems Education Journal, Vol. 1, No. 17, pp. 3 - 17.

AUTHOR BIOGRAPHY

Roderick L. Lee is an Assistant Professor of Information Systems in the School of Business Administration at The Pennsylvania State University - Harrisburg. His research and teaching interests are centered on user-centered design and the strategic use of technology by nonprofits and groups. He teaches courses in management information systems, human-computer interaction, object-oriented programming, and usability engineering. He holds a MBA and MSIS from The Pennsylvania State University – Harrisburg and a Ph.D. in Information Sciences and Technology with a concentration in Management and Organization from The Pennsylvania State University – University Park.

APPENDIX: SERVICE LEARNING MEASUREMENT INSTRUMENT

Measure	Negative	Somewhat Negative	Neutral	Somewhat Positive	Positive
Perception of service-learning					
Perception of user-centered design					
Shows evidence of general academic learning					
Shows evidence of critical thinking skills					
Shows evidence of life-long learning skills					
Shows evidence of communication skills					
Shows evidence of collaboration skills					
Shows evidence of leadership skills					
Shows evidence of personal efficacy					
Shows evidence of self-Knowledge					

STATEMENT OF PEER REVIEW INTEGRITY

All papers published in the Journal of Information Systems Education have undergone rigorous peer review. This includes an initial editor screening and double-blind refereeing by three or more expert referees.

ISSN 1055-3096