Service-Learning in Information Systems Courses: Community Projects that Make a Difference

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ABSTRACT

Service-learning methodologies provide information systems students the opportunity to create and implement systems in real-world, public service-oriented social contexts. Students contract with local non-profit and government agencies to provide needed information systems services and solutions that are closely related to the specific course topics, such as database creation for a database course, system evaluation for a systems design and analysis course, or even a larger scope for a capstone course. In these activities, students actively evaluate and analyze the complex contributors associated with understanding problem domains as well as design and implement real-world solutions. Multi-dimensional learning takes place as they simultaneously assume the role of professional consultants producing systems that are immediately used and by the client. The student learning outcomes include a deep learning of the course technical knowledge, improved interpersonal communication skills, more effective client and project management skills, and an enhanced societal sensitivity for the value of their information systems knowledge to their community.

Keywords: IS education, service learning, project management skills, professional skills, ethics, active learning, experiential learning.

1. INTRODUCTION

Information systems (IS) educators would by and large agree that it is difficult to assess whether the students are able to proficiently utilize a concept that has been explained in abstract. Real world stories are often utilized in IS courses to help the students connect the conceptual models to actual practice and to develop a broader definition of information systems that includes people and business processes in addition to the technology. However, listening to stories is not the same as actually doing IS activities (Jessup and Egbert, 1995; Matthieu 1993). By its very nature, IS is differentiated from computer science by its application of the science toward organizational information management problems.

Carefully developed and executed learning experiences, such as case studies, simulations, project-based coursework, and presentations, have become effective learning tools within the IS curriculum. These tools have been shown to enhance students' knowledge and understanding of many IS topics. In addition, they help develop both technical and professional skills (Harris 1994). "Learning is the least useful when it is private; it

is most useful when it is public and communal," said Lee Schulman, the president of the Carnegie Foundation for the Advancement of Teaching, to the American Association of Higher Education in 1998 (Eyler and Giles 1999, p. 15).

Yet, many of our individual and group learning opportunities may still fall short of equipping the student with the outcomes that research has documented as necessary for IS students to be successful in the workplace (Sivitanides, Cook, Martin, Chiodo, and Landram 1995). In addition to strong technical skills, knowledge, skills, and abilities in each of the following areas have been found to be significantly associated with the market demand for IS professionals: strong communication skills in multiple medias, project management skills, the understanding of group, organizational, and environmental dynamics, the managing of time pressures, uncertainties and ambiguities, and good systems analysis, design and implementation practices (Doke 1999).

This article presents an experiential approach to teaching and assessing the learning of IS concepts. This approach has been termed "service-learning", as the

students create/perform IS-content-related work for non-profit organizations. Service-learning embraces all of the above mentioned real-world demands for IS knowledge, skills, and abilities and is consistent with most IS course learning objectives. Service-learning projects can be designed to be appropriate in both scope and complexity for many IS course levels, from introductory to very advanced. The reason for the success of service-learning in IS pedagogy is simply that the idea is a "win-win-win." The project results are beneficial to all three parties directly involved: the student, the nonprofit organization, and the university. Indirectly, the downstream IS labor market is also a beneficiary, receiving new hires with better knowledge, skills, and abilities. The active learning of IS skills in a context of community service may be more important now, given the tragic events of the past few years.

The second section of this paper explains the theoretical basis of service-learning and summarizes the findings of prior research. The next section of this article describes sample service-learning projects and methodologies. Much of the JISE readership may find that they have already been involved in various forms of service-learning activities. The following section describes the best practices for service-learning projects in IS courses. Finally, the conclusion section summarizes the contents of this article and suggests some new avenues for IS education empirical research.

2. SERVICE-LEARNING: THEORETICAL BASIS AND RESEARCH SUPPORT

2.1 Theoretical Basis of Service-Learning
Service learning has been defined as:

> *"...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)*

IS service-learning projects can be introductory to advanced in nature, with examples such as: documenting office hardware, software, and peripherals; documenting IS staff activities, analyzing system requirements and user acceptance; designing logical and/or physical solutions; training/surveying staff on new applications; and developing databases, spreadsheets, active web pages or other information system solutions. These IS services can be provided to government agencies and non-profit organizations such as the university itself, museums, senior centers, daycare organizations, hospice centers, and schools in the local school district.

Service-learning projects typically give students direct responsibility and real-world accountability to people and organizations that have a genuine need of their

services. This combination of (1) student responsibility (2) with high public exposure as they work to (3) satisfy a real IS need in an organization that clearly does not have the resources to hire an IS firm to do the job, creates an internal demand, a "personal emotional intensity" for the learning that is difficult to otherwise achieve in the classroom or through a more private experiential learning simulations. This intensity leads to the high levels of cognitive engagement, which then yields direct knowledge discovery, acquisition, application, and dissemination benefits to the learning process (Kolb 1984).

In addition, the concepts of reciprocity and reflection also differentiate service-learning from most conventional team projects. Reciprocity refers to the "win-win" aspects of the service-learning contract that requires that each participating party experiences net benefits from their involvement. There is no separate giver, as there is no strict recipient of service. Instead, each party realizes that by contracting together, each benefits more than what it costs them give a little to each other, making it a rational choice to contract together. This reciprocity of benefit is but one of the dimensions that differentiates service learning from the well-understood idea of volunteerism, where the "providers" are clearly differentiated from the "have-not" recipients of the service (Heffernan 2001).

Reflection refers to the instructional design component of structured introspection of the different aspects of the process as well as the outcomes of the project. Reflection assumes the important philosophy that "learning comes from thinking about what we do, not by just doing, nor by just thinking." (Bonar, Buchanan, Fisher, and Wechsler 1996). Reflection in IS courses, whether performed privately in student journals, or publicly in classroom and group discussions, typically involves answering questions concerning how what they did ties into their textbook concepts, into their classroom learning, into their ethics, into their career goals, and into the more macro issues of the organizational and societal roles of IS professionals. The individual and group reflection on the learning process, the task, the people, the environment, the final IS solution, and the take-away knowledge, skills, and abilities is yet another dimension that differentiates service-learning projects from most conventional IS course projects.

David Kolb's (1984) "learning cycle" model motivated the development of service-learning methods and provides theoretical support by defining learning as a process where the thoughtful transformation of experience is what creates knowledge. Learning is viewed as an interactive phenomenon between the knowledge constructs, the learner, his/her experiences and related reflections, and their external environment. Kolb's model is graphically depicted in Figure 1.

FIGURE 1: KOLB's LEARNING CYCLE
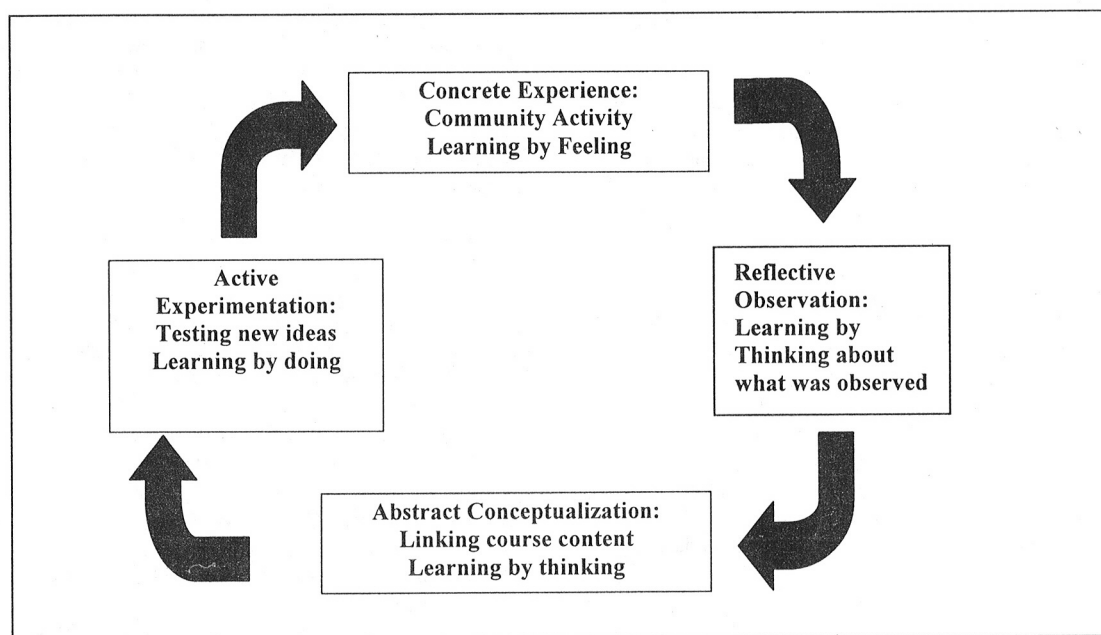
This definition of Kolb's model emphasizes the endless circular process of learning and re-learning, an ongoing process that supports the construct and attitude of life-long learning. This process emphasis or focus contrasts to the typical course project "end product" or "deliverable" as the object of focus by IS faculty to assess the quality and quantity of student learning. The typical faculty member is often left asking themselves of the probability of a student team delivering an end project without having achieved the desired learning.

Kolb's model emphasizes the process learning in addition to the ability to deliver an effective end product. Kolb's model describes a continuous learning progression involving concrete experiences, reflective observations, abstract conceptualizations, and active experimentations. Kolb explains that a learner may enter this cycle at any of the four points in the process, but must complete the entire cycle for effective learning to occur (Kolb 1984). It may be interesting to document which and how many of these four forms of learning are embraced by the tools in our IS pedagogies and methodologies toolkits. We would assert that most traditional IS course methodologies only involve/include abstract conceptualization, (e.g., textbook reading and lecture), and experimentation (e.g., testing/projects). The point made in this article is that service-learning methodologies incorporate all four types of learning from the Kolb model.

The Kolb learning cycle also provides valuable opportunities for individuals whose learning styles favor active (concrete experience) as well as reflective(reflective observation) activities, the two steps typically missing from traditional courses. Thus, incorporating service-learning into IS curricula offers students a full range of learning style opportunities.

2.2 Prior Research Support for Service-Learning
Service-learning methodologies have been adopted and successfully implemented by many faculty members across a wide range of professional disciplines and departments, such as engineering, environmental studies, and communication (Zlotkowski 2001). Research on the impact of service-learning has demonstrated that significant improvements in learning occur in students' academic performance (as measured by GPA, writing and critical thinking skills), their development of ethics (regarding personal responsibility to social issues), and in their plans to continue to participate in civic-based service activities after graduation (Astin, Vogelgesang, Ikeda, and Lee 2000).

Significant improvements in the transformation of students into apprentice professionals have also been documented with regards to students' levels of:
- personal tolerances and personal efficacy,
- leadership skills,
- communication and career skills,
- problem identification and resolution skills,
- action-consequence sensitivity, and
- sensitivities to policy, social justice, and political structure issues (Eyler and Giles 1999).

Moreover, Service-learning is already well-established in the social sciences and in disciplines in which clinical experience represents an important part of the learning process (Kenworthy and U'ren 2000).

Another primary concern of the faculty members teaching IS courses and programs is the question of the quality of IS students' ability to self-learn and use their personal, interpersonal, and project management skills with their technical knowledge throughout their careers. Many of us have been guilty of utilizing the seemingly endless increases in the market demand for our IS student supply as proxy evidence of our success in this matter. A significant number of research studies, as well as anecdotal evidence, suggest that a large number of new IS projects and applications fail, are never completed, are unusable, or contribute to negative organizational consequences (Abate, Diegert, and Allen 1998; Redman 1998; Standish Group 1997; Chaos Report 1998). These disappointing statistics further motivates IS faculty to question whether our traditional pedagogical approaches are adequately preparing our students.

The recent downturns in the demand for new IS degreed students due to the re-entry of experienced IS professionals to the IS labor supply, also helps to highlight this question regarding the quality of life-long learning habits with increased intensity: Are IS students prepared for the entire, complex, and changing nature of the IS jobs for which they are being hired? Do our IS students graduate with efficient and effective IS development and integration strategies? Do our IS students understand the importance of producing quality systems within a reasonable amount of time and resources? If the work students perform in college does not reflect the nature of what they will be doing upon graduation, then it is possible to argue that the students may not optimally apply their resources after graduation.

We suggest that four factors contribute to the disconnect between higher education and professional practice experiences. First, in most educational environments, there is a lack of public exposure for project process and deliverables when compared to the IS industry (e.g., most college projects only have to be turned into the professor for evaluation). Second, most educational projects lack the complexity, ambiguity, and goal conflict present in industry IS projects. Third, most of our IS courses' projects involve IS students working together and lack experiences with inter-disciplinary project teams, especially important when the IS graduates will be entering complex IS development environments.

Therefore, it is not difficult to argue that the IS education community could benefit from the development a set of assessable IS curriculum standards, and perhaps use service-learning methodologies as a vehicle to make significant progress on both achieving and assessing the quality of learning in our IS students. We have found that both the accounting and engineering education communities have already developed clear outcome standards to help guide their curricular decisions of each of their respective faculties. These models may be very useful to help IS faculty answer this question of long-run learning quality.

In more of a strategic planning role to help motivate accounting faculty to consider the life-long learning of their professionals, as well as to help working professionals learn what they should be learning to stay competitive in the marketplace, the American Institute of Certified Public Accountants (www.AICPA.org) has created a list for faculty of information technology skills that the various roles a CPA may need in their careers, as information user, manager, designer, or evaluator (AICPA 1999). In addition, the AICPA has created a core values and competencies vision for 2011 that includes:
- a life-long commitment to technical competency;
- a sensitivity to ethics and integrity,
- a well-based grounding in broad business issues,
- strong communication skills;
- strategic scope analysis skills
- critical thinking skills;
- a focus on the customer, the client, the market, and
- the ability to integrate converging information from a variety of sources and data types. [AICPA 2001]

The Accreditation Board for Engineering and Technology (ABET 1998) has also developed program assessment standards for the preparation of their professionals. Engineering education programs are now required to demonstrate that their graduates have, among other technical competencies:
- an ability to function on multidisciplinary teams;
- an understanding of professional and ethical responsibility;
- an ability to communicate effectively;
- a broad education necessary to understand the impact of technical solutions in a global and societal context; and
- knowledge of contemporary issues (ABET 1998)

The complex nature of the system design and development process illustrates the importance of assessing IS learning quality. Many organizations currently seek to build and manage this type of organizational knowledge and memory over broad networks. They have learned that successful projects are largely driven by the needs of the information consumers, the requirements of those who establish the boundaries, the properties of the problem domain, and the requirements of the solution's information.

For example, the commonly utilized process-centered application development approach must incorporate three conceptually distinguishable domains: the modeling domain (conceptualizing the problem domain into a suitable physical model), the performance domain (subjecting the solution to many performance constraints including the physical representation, the network topology, system configuration, and system administration), and perhaps the most difficult process to administer, the enactment domain (presentation to the consumer for interpretation and use). The representation of the system after each of these domain layers contributes to the perceived quality of the solution by the information consumer.

Therefore, IS pedagogies and learning methodologies should involve tasks and assessments that capture these critical elements:
(1) the cycle *process* is managed to a successful outcome,
(2) the *model* itself represents a diverse and fuzzy problem domain,
(3) the quality of the *data* in the database has sufficient grade, and
(4) the application *behaves* or has the ability to behave in a way the consumer understands.
Service-learning provides a unique opportunity to teach these complex concepts in a way that is both understandable and controllable.

3. SERVICE-LEARNING PROJECT EXAMPLES

Over the past 10 years and for hundreds of students, service-learning methodologies have been incorporated into Business Database Systems, Systems Development, Accounting Information Systems, and eBusiness courses. These IS students work with local non-profit organizations to produce tangible, professional systems that serve real community or organizational needs. All projects undertaken must be meaningful (i.e., needed, important, worthwhile, and deserving of commitment) to the four constituencies: the
participating students, the faculty, the non-profit agency, and the university. This section will describe some of the projects from the Business Database systems ad the Systems Development courses.

Service-learning projects should address a real unmet IS need in these organizations, develop the students' project management and other professional skills, and enhance the students' understanding of a civic or social issue. Table 1 provides a partial list of the nonprofit, city, county, and university agencies and departments that have participated as "clients".

The technical service performed for service integration clients is consistent with the "consultative" model of service-learning (Kenworthy-U-ren 2000). The process starts by soliciting unmet information management needs by local non-profit "clients" who cannot afford

local IS consultant fees. It needs to be clear that IS students are not taking business from the local IS firms.

Service-learning projects have included all elements of the system development life cycle: students learn (either individually, in their group or as a class) to complete the design for the agency operations, perform analysis techniques (interviews, process, and document review, etc.), develop a set of specifications for the application, build the applications and deliver the solutions.

The students apply project management techniques throughout the process. Application solutions typically end up as databased, menu-management system driven, easy-to-learn, easy-to-use, and intuitive. Specific project objectives (stated as verbs to highlight action learning) include:

1. Analyze the current information environment and the problem areas for focus
2. Analyze and document the computing environment
3. Design the database and application requirements
4. Implement the systems using the MS Access database
5. Test and install a production version of the completed application
6. Discuss the outcomes and significance of the project,
7. Gather data from the client staff and students for measurement and satisfaction.

These objectives are designed to result in very specific, measurable, and demonstrable outcomes. Also note that the students' grade from these projects comes from performance on IS-knowledge measures rather than from a sum of their hours of volunteering. The volunteering is the vehicle, the learning is the cargo.

Service-learning benefits are substantial in both scope and significance to each of the stakeholders. The students are provided with a deeper, more complete and integrated learning of IS concepts and processes. In the process, they have utilized professional IS consultant skills, and have developed a new network of community mentors. They leave the course armed with real-world evidence of the work they are capable of performing, with a new sense of commitment to their career, their role in society, and their integrity. Many students have been hired by their non-profit partners or organizations represented on their board of directors, and many continue volunteering after the course is finished. The non-profit agencies are able to deliver their services more efficiently, leaving more of their resources available to be spent on items directly related to their missions.

The service-learning projects document and support collaboration between the university and the community, complement outreach and public relations goals, and can help uncover new areas of research,

Table 1: Sponsors and Projects

"Service-Learning... 'kept me interested in class', 'Gave me the opportunity to develop a real-world project for my portfolio', 'corresponded directly to course material and was fun and educational – not just what I learned about others, but myself', 'made me rethink my values on the matter', 'introduced me into the real world'."

Comments from IS Service-Learning Students in Course Evaluations

Sponsor	Project
Alternatives to Violence	Incident Tracking
American Kennel Club (Bernese)	Genealogy
City of Fort Collins	Help Desk System
Colorado Department of Transportation	Training Program
Colorado State Forest Service	Web Development
CSU Hartshorn Health Services	Health Promotions DB
CSU Art Department	Graphic Check-in/Check-out System
CSU College of Natural Sciences	Student Certification
CSU Cooperative Extension	Pesticide Recovery
CSU Help/Success Center	Scheduling
CSU International Programs	Family Placement System
CSU Library	Flood Damage Database
CSU Police Department	Property/Evidence Management
CSU Tri-Ethnic Center	Recruitment Database
CSU Veterinary Teaching Hospital	Web-based Instructional Simulation
Denver Police Department	Leave Administration
Education and Life Training Center	HW/SW Implementation, Volunteer Tracking system
Education and Life Training Center	Back-to-School Program, Student Services
Environmental Protection Agency	Pesticide Recovery
Erie Chamber of Commerce	Membership Tracking
Estes Park Medical Foundation	Donation Tracking
Fort Collins Force Pro Soccer Team	Player Management System
Institute for Alcohol Awareness	Client Management System
Larimer Food Distribution Center	Customer Tracking System
McKee Medical Center	Gynecologic Cytology Application
NewWest Fest	10K Race Registration
Poudre (local river name) Health Services District	Health Van Patient Tracking, Contact Management
Poudre (local river name) Health Services District	Volunteer Tracking Systems
Poudre (local river name) School District	Vehicle Fueling
Ronald E. McNair Scholarship Program	Membership Tracking
The Peace Corps	Volunteer Management
The University Club	Membership Accounting
Wind River Indian Reservation	Enrollment Tracking System

potential joint grant opportunities, and access to educational case data. Faculty members are often energized by the vitality of the course activities, the related instructional creativity, and are rewarded for their service-learning outreach, research and service activities and contributions.

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4. Best Practices for Service-Learning Projects

Many institutions have developed guidelines and best practices for faculty who wish to create effective service-learning (SL) in their courses and curriculum. For example, our university has opted to keep the definition of and rules for service-learning rather strict, in order to protect each of the contracting partners:

- The SL project must be driven by course specific academic learning objectives. The specific IS-knowledge measures used to grade a service-learning project would depend on the specific course. A database course would involve a database project and assess on database knowledge. A web-programming course would involve the development of an active web page, for example, which is what would be tested for web programming knowledge. A systems analysis and design course may require a systems life cycle type of project, etc. Put another way, an IS course service learning project must involve IS issues – the students shouldn't be simply volunteering for Habitat for Humanity or cooking at the Homeless Center unless they are also developing IS solutions for these organizations.
- The SL project must be directly and specifically connected to the course content learning goals with clear statements about the learning experience expectations and outcomes in the course syllabus, as well as clearly explained to the students in the first week of class.
- Faculty should try to stay with the nonprofit or government agencies for service-learning projects

due to the possibility that there may be possible "turf" conflicts of service-provision with small business institutes or entrepreneurship incubators on campus or in the community. However, if your university or community does not have such services for the local entrepreneurs, service-learning projects for struggling small and family owned businesses make great service-learning experiences.

- Reflection and feedback on the SL project should be on-going and multi-modal (individual and in group). It should include weekly detailed progress reports to the faculty member, discussion about understanding of the course's academic abstract constructs, the application of constructs to specific situations, the internal and external variables encountered during the process of the project, awareness about personal and team strengths, sensitivity to community needs, the diversity of resources and goals, and the development of community and citizenship values.
- Partner agencies should explicitly define their needs, commit to the scope of the relationship and be included in planning and evaluation of the service-learning outcomes.
- The faculty member should familiarize themselves with the agency mission, clientele, location, needs, and staff in order to be able to mentor the students.
- Students should be trained prior to beginning the SL project, either by the faculty, SL office staff, or the partner agency staff, and the training will provide clear expectations, point/contact personnel, resources, responsibilities, deadlines, and any risk management issues.
- The service-learning project "minimum time involved" expectations should be consistent with the overall institution guideline for SL (if one exists), and should be logical the culture of the program with regards to time involved for projects and the percentage from the syllabus that the project determines of the final course grade. For example, a 3-hour, 15-week semester course with a SL project worth 20% of the final course grade may require a *minimum* of 15 hours of working with the partner agency (which could either be viewed as one hour per each week of a 15 week semester, or 5 hours per week for the last 3 weeks of the semester); the percentage of the course grade determined by the SL project is typically directly correlated with the minimum number of hours that the service-learning project should take a team to complete the task – greater percentage of course grade typically means more hours working with the partner agency.
- Academic credit should be awarded for the discipline-specific learning gained and course-related outcomes produced from the experience, not for simply participating in the service (e.g., showing up each week to talk to the partner agency staff) or enjoying the experience.

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- Students, faculty and community representatives should participate in the university-level SL course evaluation process, to help administration learn about and support the service-learning efforts by all of the stakeholders, and
- Faculty, administrators and partner agencies should do everything they can to bring media attention and publication for the achievements of the students and the university-community partnership that has been developed. (Colorado State University, 2000).

Service-learning course effectiveness for IS courses is maximized by clearly planning and commitment to: scope definitions, process steps, working deliverables, clear teams structure and responsibilities, regular communication with client and with the student teams, and public dissemination of results (Heffernan, 2001).

Ideally, accurate identification of project scope should occur before the semester begins through a contact with the non-profit agency. This will help maintain control over the learning process, and equity across student groups with regards to the size and difficulty of the projects. Faculty can either place an announcement to local agencies and organizations concerning the opportunity, call them individually, or utilize any university-level volunteer center staff to identify and develop a relationship. Alternatively, a faculty member may require the students to "scour" the community and find projects for themselves. This approach develops client recruitment skills in the students, but needs very clear scope and complexity rules to be communicated to the students, and then to each of the partners that are developed.

Faculty need to be aware that different service-learning projects within a course add an additional load to their project supervision work. There is a wide range of project variations within a course. For example, a faculty member can choose a homogeneous project approach and keep every student team on the same type of project (e.g., training all users on the same new application, or each student documents the same business process (cash collections) for each agency, or everyone is involved in a donor contact database development across different nonprofit agencies). This approach facilitates group and limited scope discussions in the class about the projects. Alternatively, faculty may choose to have all of their students go to one large organization (e.g., the county or city offices) and do either similar or different tasks for that organization). This approach facilitates organizational culture and the importance of organization-wide IT service standards discussions in the classroom. Finally, ambitious faculty or faculty with small class sizes can support different student teams doing different projects for different organizations.

Clear deadlines and explanations of required process deliverables (milestones) on the syllabus helps keep the students on track and provides the faculty with a rich set of feedback and assessment opportunities. Weekly progress reports are very useful to keep a faculty abreast of all issues faced by the student teams, as well as by the partner agencies. Also, they help develop and highlight the importance of honest progress communication between IT professionals.

Faculty should serve as the overall project manager, and may need to serve as an intermediary for all team questions to the agencies, as some student teams do not initially understand the importance of respecting the partner agency staff time and energy. A good model is to require the students to make weekly appointments with the staff of the agency, and to collect their questions throughout the week to ask at the weekly meeting, rather than continually calling or emailing the agency staff with unorganized questions. These process controls help avoid potential extraordinary burden on the non-profit staff as well as keeps you abreast of the progress and the issues of each student team.

Anecdotally, we have found that the ideal team size for these types of IT projects to be no more than three-to-four students. This team size seems to reduce many of the dysfunctional issues of team projects, and allow the students to learn about and take advantage of the delegation of work between team members. Most student teams need some guidance to help them build team rules and expectations regarding quality of work, ethics, communication rules, cohesion and trust.

An important consideration is to develop a post-implementation support system for the maintenance the solution may need over the time that the organization uses the tool. We have found several interesting possibilities to include passing the "maintenance charge" to the consulting committee of the CIS club, and managing an internship or independent study per semester to maintain contact with all partner agencies and to provide maintenance if needed. Otherwise, with the normal goal of helping the students graduate and leave the area, the faculty may be left with an obligation to the non-profit agency.

Finally, last but not least, give the students the credit they have earned. Notify all relevant university administrators, recruiters, alumni, and local media outlets of the projects and participants. Be creative, develop a service-learning website, send internal emails within your college and to your peer institutions depicting your students' work, and highlighting as many inter-disciplinary projects are possible (for example, in joint projects with accounting courses, finance courses, marketing courses, or entrepreneurship courses, or with Spanish courses for providing IS solutions to minority organizations).

Don't hesitate to develop your own creative interpretations of service-learning for your courses. For example, a networking possibility is match each student

teams to an alumnus of your IS program for mentoring on the project. This structure helps the students get to know local IS professionals, and feel more comfortable asking questions about the project, as the alumni won't be grading the students. Many times the alumni want to continue helping the organizations for which they did their service-learning projects. Another possibility is to have the student teams present their solutions to the non-profit board of directors. Many students have eventually gotten their job offers through the board of directors members who were impressed with their work.

A final suggestion, which was a complete success, involved implementing a competitive element to the service-learning IS semester project. Each of the student teams presented their projects at the end of the semester to a panel of the top recruiters, and the winning project team won scholarships for their next semester. Again, a "win-win" solution because the students worked harder as they wanted to win the scholarships, as well as show their skills to the top recruiting organizations, and the recruiters received an organized, relevant "sneak peak" at the students at work!

5. CONCLUSION

Integrating service-learning into IS courses has proven to be an effective method to improve the IS learning experience, accurately assess the knowledge, skills, and abilities learned during the course, develop strong, effective values of project management, teamwork, leadership, and civic participation, and help develop the role of the university in the community. The projects described in this paper illustrate a new, holistic method of teaching the complex real-world nature of a career as a IS professional. The step which follows the adoption of service-learning methodologies is to formally and scientifically test and document the anecdotal evidence that academic learning is significantly more broad, more deep and longer with a service-learning methodology. Perhaps this could be most efficiently tested in programs where there are either (a) optional service-learning components where non-service learning students' test scores are compared to service-learning students, or (b) a two-section course, where the lecture/textbook content is controlled across sections, but one section has service-learning components where the other section does not, again testing for knowledge differences, or (c) utilizing a lecture-test-service-retest model to determine if there is an improvement in the learning within students.
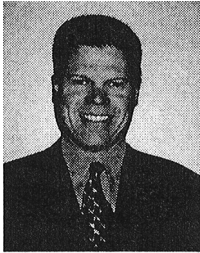
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