

# Service Learning in Computer Information Systems: "Significant" Learning for Tomorrow's Computer Professionals

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## Abstract

This paper makes the case for employing Service Learning as an educational paradigm in Computer Information Systems education. L. Dee Fink's taxonomy of "Significant Learning" is presented and Service Learning is defined and discussed. The case is made for using a Service Learning approach for today's college students. Examples of Service Learning in Computer Information Systems courses are presented at both the undergraduate and graduate levels. It is shown that using a Service Learning approach yields significant learning in Computer Information Systems education. Implementation issues are discussed and future directions for curricular development are presented.

**Keywords:** service learning, significant learning, computer information systems pedagogy

## 1. INTRODUCTION

Efforts to develop model curricula in Computer Information Systems have placed heavy emphasis on "what" should be taught in various courses or learning modules, but little attention has been given to the pedagogical issue of how best to deliver the course content to both (1) maximize student learning of content while (2) simultaneously addressing larger societal and educational issues. The use of a Service Learning approach to the teaching of Computer Information Systems has the potential to develop information systems professionals who possess the skill set necessary to succeed in the information systems field and who also understand the civic responsibility associated with being educated corporate and community citizens.

## 2. WHAT IS "SIGNIFICANT" LEARNING?

One of the initial tasks teachers face when designing a course is deciding what they want their students to learn. Students will always learn something, but good teachers want their students to learn something important or significant, rather than

something relatively insignificant. This leads to a question that is central to the entire teaching enterprise: What are the ways in which learning can be significant? If we can develop a conceptual framework for identifying the multiple ways in which learning can be significant, then teachers can decide which of the various kinds of significant learning they want to support and promote in a given course or learning experience.

The most common taxonomy of educational objectives was developed by Benjamin Bloom and his associates (Bloom, 1956). This cognitive taxonomy consists of six kinds of learning that are arranged in a hierarchical sequence, from highest to lowest, as follows: Evaluation, Synthesis, Analysis, Application, Comprehension, Knowledge (recall).

There is no questioning the value of Bloom's taxonomy. Teachers have used this taxonomy both as a framework for formulating course objectives and as a basis for evaluating student learning for close to half a century – any model that withstands the test of time and commands this type of

respect is truly extraordinary. However, individuals and organizations involved in higher education are expressing a need for important kinds of student learning that do not easily emerge from Bloom's taxonomy – for example; learning how to learn, leadership and interpersonal skills, ethics, communication skills, character, tolerance, the ability to effectively adapt to change, etc.

L. Dee Fink (2003), Director of the Instructional Development Program at the University of Oklahoma and President of the Professional and Organizational Development (POD) network (the largest faculty professional development organization in North America), has suggested that what those in higher education are expressing is a need for new kinds of learning, learning that goes well beyond cognitive learning itself. Fink posits the needs for a broader taxonomy of "significant learning" to address these new learning objectives as follows:

- 1) Foundation Knowledge – understanding and remembering facts and ideas;
- 2) Application – acquiring skills, creative and critical thinking, managing projects;
- 3) Integration – connecting ideas, people, and realms of life;
- 4) Human Dimension – learning about oneself and others;
- 5) Caring – developing new feelings, interests, and values; and
- 6) Learning How to Learn – becoming a better student, inquiring about a subject, self-directed learners.

Fink's taxonomy defines learning in terms of change – i.e. for learning to occur, there has to be some kind of change in the learner. For Fink, "significant" learning *requires* that there be some kind of *lasting* change that is important in terms of the learner's life.

### 3. THE NATURE OF SERVICE LEARNING

#### Service Learning (SL) is an Educational Paradigm

Service Learning integrates community service with active guided reflection in ways that both enhance and enrich student learning of course materials while

simultaneously providing real benefits to the community. Elements of a SL Course typically include the following:

- 1) The SL component of the course is designed jointly by the course instructor and the community partner; both the instructor and the community partner are engaged in ongoing dialogue and supervision of the students;
- 2) Significant student participation in service projects that help meet real community needs, as identified by the community partner, and leaving lasting benefits to the community;
- 3) The service project requires a serious and ongoing commitment of time predominantly spent working directly with a community group or a nonprofit agency. Service projects should achieve some level of completion by the end of one semester;
- 4) Experiential SL is integrated with texts, lectures, and research and/or writing assignments as part of the learning objectives of the course;
- 5) The course requires written and/or oral reflection by students on the relationship of their service experience to both the academic course material as well as their personal growth; and
- 6) Grading for the SL component of the course constitutes a significant portion of the final course grade.

#### Service Learning (SL) is a Pedagogy

Service Learning is an educational pedagogy

- 1) Under which students learn and develop through active participation in thoughtfully organized service experiences that meet actual community needs and that are coordinated in collaboration with the school and community;
- 2) That is integrated into the student's academic curriculum and provides structured time for a student to think, talk, or write about what the student did during the actual service activity;
- 3) That provides students with opportunities to use newly acquired skills and knowledge in real-life

- situations in their own communities;  
and
- 4) That enhances what is taught in school by extending student learning beyond the classroom and into the community and helps to foster the development of a sense of caring for others.

Service learning falls under the umbrella of experiential education. Along with internships and cooperative experiences, service learning seeks to expand students' learning outside the typical classroom setting. Service learning is a form of experiential learning where students and faculty collaborate with communities to address problems and issues, simultaneously gaining knowledge and skills and advancing personal development. There is an equal emphasis on helping communities and providing valid learning experience to students.

Service learning requires that faculty members be actively engaged as teacher/mentors with students. Students learn new knowledge and skills that contribute to their education. Students have the opportunity to reflect critically upon their experiences. The service provided meets a need identified by the community to be served. Those receiving the service have significant involvement and control over the activities engaged in by students and faculty.

#### **Characteristics of a Service-Learning Course:**

Service Learning courses are courses (in) which:

- Community service serves as the vehicle for the achievement of specific academic goals and objectives.
- Provide structured time for students to reflect on their service and learning experiences through a mix of writing, reading, speaking, listening, and creating in small and large groups and individual work.
- Foster the development of "intangibles"- empathy, personal values, beliefs, awareness, self-esteem, self-confidence, social-responsibility, and help to foster a

sense of caring for others.

- Are based on a reciprocal relationship in which the service reinforces and strengthens the learning, and the learning reinforces and strengthens the service.
- Credit is awarded for learning, college-level learning, not for a requisite number of service hours.

Service Learning differs from community service, internships, cooperative ed., etc. in that:

- Service learning uses community service as the vehicle for the attainment of students' academic goals and objectives.
- Community service fills a need in the community through volunteer efforts. Service learning also fills that need, but it uses that need as a foundation to examine our society, our future, and ourselves. Further, service learning provides students with opportunities to use newly acquired skills and knowledge in real-life situations.
- SL courses identify in advance, and track, specific learning objectives and goals (as well as the intangible ones).
- Students perform a valuable, significant, and necessary service which has real consequence to the community.
- The goal of the service is to empower students and those being served.
- The needs of the community dictate the service being provided.

#### **Service Learning Benefits**

Service learning experiences are reciprocally beneficial for both the community and the students. For many community organizations, students augment service delivery, meet crucial human needs, and provide a basis for future citizen support. For students, community service is an opportunity to enrich and apply classroom knowledge; explore careers or majors; develop civic and cultural literacy; improve citizenship; develop occupational skills; enhance personal growth and self-image; establish job links; and foster a concern for social problems, which leads to a sense of

social responsibility and commitment to public/human service.

Service Learning is much more than just doing service. Service Learning allows us to see ourselves, to examine our society, and to see what lies ahead. Participants in the program should study and reflect upon the nature of citizenship before they participate in a service learning project, do the project, and then reflect upon the project and its influence upon their roles as citizens later. This three-step process of learning, doing, and reflecting helps students realize and appreciate that service is and should be a life-long learning experience.

The very idea of service suggests that not all the benefits of service-learning are reaped by faculty and students. Community service addresses a vast variety of social problems. Community service creates and strengthens connections between people and serves the needs of the community as a whole. Service learning can be an important part of a student's civic education, influencing such characteristics as political action skills, communication skills, critical thinking skills and tolerance.

National research studies indicate that service-learning improves academic achievement across a wide variety of disciplines. In particular, a solid research base exists for the following claims:

- Service connected to specific courses can enhance the learning of the course content.
- Service Learning has a positive impact on students' personal, social, and cognitive outcomes.
- Participation in a Service Learning program can improve the interaction between faculty members and students, which itself has a positive impact on learning.
- Service Learning enhances students' beliefs in their personal efficacy and can be a predictor in their further professional development.

Since students see themselves as resources and part of the solution to problems, their service work raises their self-esteem. Their view of who they are and of their role in the world is enhanced by service learning.

In the past several years, service learning has spread rapidly throughout colleges and universities. In a recent survey of its member institutions, Campus Compact gathered information on trends in community involvement and service across a good cross-section of the nation's colleges and universities (Compact, 2001). During the 1999-2000 academic year, among the 349 campuses that responded to the survey,

- 712,000 students had participated in some form of service
- 12.2 percent of faculty were offering service-learning courses
- 6,272 service-learning courses were taught
- 9 percent required service-learning courses for graduation

#### **4. WHY SERVICE LEARNING FOR TODAY'S COLLEGE STUDENTS**

College students say they are looking for new ways to get involved in the community and that they are interested in issues of social justice and democracy. For many, civic engagement comes from community service. Today's youth are more likely to report being involved in their community, in their spiritual beliefs, and their families than were youth a decade ago. A 1999 Quinnipiac University Polling Institute survey of Connecticut residents found that residents age 18 to 34 were just as likely to say they have volunteered in the community as older residents were.

Still, college students face a culture that places greater value on personal advancement than the good of communities. A 1998 study found that people between the ages of 15 to 24, by a 2-to-1 margin, care more for career goals, personal success and family than for more group-oriented goals like voting or helping the local community be a better place to live.

Universities and faculty are in a unique position not only to measure levels of civic engagement and indifference, but also to create an environment and a curriculum that enables students to grapple critically with the meanings of community, citizenship, and participation. Can colleges and universities

help students do a better job of being citizens while still upholding high standards of academic performance? Quinnipiac University believes it can make a positive difference.

Quinnipiac University and many other higher education institutions have adopted policies and programs that encourage faculty and students to experiment with SL approaches to learning. SL is based on the idea that concrete experiences in the local community should be enhanced and deepened by reflection and theory. Despite the fact that research has shown that we remember only 10% of what we hear, 15% of what we see, and a mere 20% of what see and hear, these remain the basic sense modalities stimulated in most education experience. SL strategies recognize that we retain 50% of what we do, 80% of what we do with active guided reflection, and 90% of what we teach or give to others.

## 5. SERVICE LEARNING EXAMPLES IN THE CIS CURRICULUM

### ***Service Learning Examples from Quinnipiac University***

Quinnipiac University has integrated Service Learning into several courses at both the graduate and undergraduate levels. Selected examples are as follows:

**Graduate E-Commerce Course:** Students in the graduate e-commerce course prepared web sites for public entities. For example, the QUIT website, Quinnipiac University's quit smoking site.

**Graduate Systems Analysis & Design Course:** Students in the graduate systems analysis and design course worked with the City of Hamden, Connecticut to suggest efficiencies in the use of information systems and information technology. Departments that the students worked with included: Public Works, Parks and Recreation, Building, Engineering, Planning and Zoning, Risk Management and Community Development.

**Undergraduate Systems Analysis & Design Course:** Students in this class analyzed and suggested various technology solutions for the Albert Schweitzer Institute, which is housed on the Quinnipiac University

campus. Students designed and implemented a web site to assist the institute in promoting both its programming and fund raising activities.

### ***Service Learning Examples from Other Colleges and Universities***

Service Learning has been implemented in a wide range of colleges and universities at both the graduate and undergraduate levels. The following examples are taken from the graduate and undergraduate programs of Towson State University and Yale University:

**Graduate Web Usability Course:** In the graduate web usability course at Towson University, students work with local non-profit organizations to help make their web sites accessible for users with disabilities. Over time, the students have helped over 30 organizations, and at the same time, students have had real-world experiences that have helped them to apply the material learned in the classroom.

**Graduate Frontiers of Science:** At Yale University, graduate students and faculty in the Frontiers of Science course offer opportunities for high school students to come to the Yale laboratory facilities for an orientation to engineering and other scientific and technical work.

**Undergraduate Software Design:** At Yale University, undergraduate students design personalized software for local non-profits to better manage volunteers, resources, finances, inventories, etc. For example, The Yale University Volunteer Action Center needed a program to match volunteer needs and class goals with both community and agency needs.

**Undergraduate Web Design Course:** In the undergraduate course, students at Towson University work with local non-profit organizations to build new web sites or re-design currently existing web sites.

## 6. SIGNIFICANT LEARNING VIA SERVICE LEARNING

### **Significant Quantitative Research Findings regarding Service Learning**

The following quantitative research findings are extracted from a summary prepared by

the UCLA Higher Education Research Center Service Learning Clearinghouse.

- Service participation shows significant positive effects on all 11 outcome measures for higher education: academic performance (GPA, writing skills, critical thinking skills), values (commitment to activism and to promoting racial understanding), self-efficacy, leadership (leadership activities, self-rated leadership ability, interpersonal skills), choice of a service career, and plans to participate in service after college.
- Benefits associated with course-based service were strongest for the academic outcomes, especially writing skills.
- Results with graduate and professional school admissions tests were generally non-significant, with one exception: service participation can have a positive correlation with the student's LSAT score, but only if the student is able to discuss the service experience with the professor.
- Service participation appears to have its strongest effect on the student's decision to pursue a career in a service field. This effect occurs regardless of whether the student's freshmen career choice is in a service field, a non-service field, or "undecided."
- The positive effects of service can be explained in part by the fact that participation in service increases the likelihood that students will discuss their experiences with each other and that students will receive emotional support from faculty.
- Both the quantitative and qualitative results suggest that providing students with an opportunity to process the service experience with each other is a powerful component of both community service and service learning. Compared to community service, taking a service-

learning course is much more likely to generate such student-to-student discussions.

- Better than four in five service-learning students felt that their service "made a difference" and that they were learning from their service experience.

*The single most important factor associated with a positive service-learning experience appears to be the student's degree of interest in the subject matter.* Subject-matter interest is an especially important determinant of the extent to which (a) the service experience enhances understanding of the "academic" course material, and (b) the service is viewed as a learning experience. These findings provide strong support for the notion that service learning should be included in the student's major field.

*The second most significant factor in a positive service-learning experience is whether the professor encourages class discussion.*

The frequency with which professors connect the service experience to the course subject matter is an especially important determinant of whether the academic material enhances the service experience, and whether the service experience facilitates understanding of the academic material.

The extent to which the service experience is enhanced by the academic course material depends in part upon the amount of training that the student receives prior to service participation.

#### **Significant Qualitative Research Findings regarding Service Learning**

The following qualitative research findings are extracted from a summary prepared by the UCLA Higher Education Research Center Service Learning Clearinghouse.

- Qualitative findings suggest that service learning is effective in part because it facilitates four types of outcomes: an increased sense of personal efficacy, an increased awareness of the world, an increased

awareness of one's personal values, and increased engagement in the classroom experience.

- The qualitative findings suggest that both faculty and students develop a heightened sense of civic responsibility and personal effectiveness through participation in service-learning courses.

Both qualitative and quantitative results underscore the power of reflection as a means of connecting the service experience to the academic course material. The primary forms of reflection used were discussions among students, discussions with professors, and written reflection in the form of journals and papers.

Both the qualitative and quantitative findings provide strong support for the notion that service-learning courses should be specifically designed to assist students in making connections between the service experience and the academic material.

### **Significant Learning via Service Learning**

For Quinnipiac University's undergraduate course in Systems Analysis and Design, the following qualitative findings were observed:

**Foundation Knowledge:** The course as structured does employ a traditional text and exams are given on the text material. This provides the opportunity to measure comprehension of basic facts and ideas relevant to the analysis and design process. The acquisition of this foundation knowledge provides the basic understanding that is necessary for other kinds of learning to evolve.

**Application:** Moving beyond case studies and working on real projects in real time provides students with the opportunity practice the skills necessary to be a successful analyst, engage in critical and creative problem solving, and manage projects in a real time environment. This application learning allows other kinds of learning to become useful.

**Integration:** Working on real projects moves analysis and design beyond the realm of text into the realm of real

systems for real people. Sometimes students make connections between specific ideas, between whole realms of ideas, between people, and between different realms of life (e.g., between school and work or between school and social life). The act of making new connections gives learners a new form of power, especially intellectual power.

**Human Dimension:** Working for SL projects and reflecting on those experiences provide students with a new definition of what it means to be human and a new sense of responsibility for the human condition. They discover the personal and/or social implications of what they have learned. In the process they develop a new understanding of themselves (self-image) or a new vision of what they want to become (their self ideal). At other times they acquire a better understanding of others – how and why others act they way they do, or how the learner can interact more effectively with others. Thus, they acquire an appreciation for the human significance of what they are learning.

**Caring:** Sometimes a learning experience changes the degree to which students care about something. This caring may be reflected in the form of new feelings, values, and/or interests. When students care about something (homelessness, health care, world peace, disadvantaged youth, etc.) they then have the energy they need for learning more about it and making it a part of their lives. Without this energy for learning, nothing significant can happen.

**Learning How to Learn:** The reflective nature of the SL experience teaches students something about the process of learning itself. They may learn how to be a better student, how to engage in a particular kind of inquiry (e.g.; interviewing skills, learning by observation, etc.), or how to become self-directed learners. This kind of learning enables students to continue learning in the future and to do so with greater effectiveness.

## **7. IMPLEMENTATION ISSUES & CONCERNS**

### **Start Small**

Establishing a critical mass of sites for SL

projects is not an easy task. It is highly recommended that you start small, usually with a site or two receptive to the idea of SL, and build on your successes. It is critical to establish a face-to-face contact with a "project champion" at the SL site, providing realistic expectations concerning project scope, student roles, and course deliverables.

### **Liability**

It is recommended that the course instructor consult with his/her university/college attorney or risk manager to review all procedures, coverage and risk, etc. In particular, all parties involved in the SL experiences should:

- Be aware that there is an inherent assumption of risk for which all students are responsible. All volunteers and service-learners should be fully informed, in advance, of any risks inherent in the activity. Most knowingly consent to undertake such risks.
- Exercise due care and attempt to foresee dangers to students and take whatever precautions seem reasonable to avoid them.
- Work in advance of the course to prepare a list or "pre-approved" sites. Discuss the list in detail going over each agency. The professor should be confident in the agency site, mission, and service activities prior to sending students out to interview with the project champion at the agency.
- All service-learners should ideally sign a waiver of liability written/approved by the university's attorney.
- The agency that provides the service-learning experience will, in most cases, be responsible for the acts of students assigned to it and assumes the responsibility for the student. Be certain the agency has liability coverage/insurance for volunteers.

### **Identifying Key Faculty**

It is vital to the success of any SL program that you identify "key" faculty (i.e. those faculty who have the esteem and respect of their peers). These faculty will become your

department's SL ambassadors and will be the foundation of your department's image to other faculty and the university administration. Think quality, not quantity. Resist the temptations of the "numbers game"- lots of students and doing lots of hours.

Excellent faculty candidates to start a SL program are faculty who:

- Are involved in the leadership of the Faculty Senate or in their departments as Chairs or Co-chairs.
- Have won institutional awards for service to the college or to students.
- Sit on influential committees or boards (inside and outside the university).
- Are esteemed by other faculty- ask faculty to give you suggestions on who to contact.
- Are respected by students- ask them, talk to your student government association, perhaps they have a special award to recognize outstanding faculty (and staff)

### **Winning Over Faculty**

Faculty are people too. And like all people, they are susceptible to the same fears and apprehensions which you feel: the risk of standing out; of getting involved in a project or event which, if it goes down the toilet, will damage their reputation; they fear the risk of stepping on toes; the risk of change and daring to do it differently; and the risk of wasting their personal, professional, and their students' time. In order to win over the key faculty, you must establish yourself as "the expert." You will win the respect and trust of faculty if you are:

- Well versed, knowledgeable, confident, honest, and energetic about your commitment to service-learning;
- Able to inspire others to excellence through your enthusiasm and belief. With permission of the course author's it is acceptable to "borrow" successful syllabi from comparable colleges and inspire a bit of professional jealousy;
- Able to help faculty feel that incorporating service into their

- courses is the easiest thing in the world to do;
- Understanding about department curricular matters- it is essential that you not make demands on other faculty or tell them how it should be done;
  - Sensitive to the existing institutional climate, pressures, and priorities which faculty must deal with.
  - Able to generate incentives: positive press, awards, information on grants, free trip(s) to conferences/seminars, promotion of their course to generate sufficient enrollment, and recognition for them and the courses they teach;
  - Able to win the trust and respect of upper level administrators. Send them updates and positive memos to recognize faculty;
  - Able to help them see the benefits of SL (taking on new roles, seeing students excited and the classroom energized, personal connections with students, learning from their students, greater student involvement in discussions, new relevance of subject...).

### Recruiting Faculty

Regardless of how strong your institution's commitment is to supporting Service Learning, marketing and publicity is the name of the game. Obviously, the less your institution is committed to SL, the more aggressive you need to be to make progress. During your first year or two there are many activities that you can do to help develop a climate that supports SL. Suggested activities include the following:

- Develop a campus-wide survey on community service and service-learning. See who's out there and what they are doing.
- Develop a one-hour workshop on service learning. Make it short, clear, and give attendees time to talk and share. Have food.
- Speak in faculty meetings and committees. Whenever and wherever faculty gather, make a point of being there.
- Set-up one-on-one meetings. This is one of the most effective tools you have at your disposal. Go in there

with concrete examples. Inspire them. Listen to them. Begin to create those relationships that will pay dividends for years to come.

- After you establish ties with faculty, have lunch talks (you buy!) and pick their brains. Ask for their help. Ask!
- Volunteer for campus committees/boards and advisory councils. A great place to make on-campus contacts.

### 8. CONCLUSIONS

Survey after survey of corporate recruiters put work ethic, communications, information gathering, ethics, and people skills at the top of the list of skills they seek in prospective employees. Yet the same recruiters insist that those they hire have a sound technical base. Our task, then, is to provide our graduates with both the "soft" and technical skills necessary for both career success and success in their personal lives. The use of a Service Learning approach in Computer Information Systems education has the potential to develop information systems professionals who possess the skill set necessary to succeed in the field and who also understand the civic responsibility associated with being educated corporate and community citizens.

Future directions will involve seeking out additional not for profit community-based agencies for whom service can be provided. Indeed, this is a continuing process. Additionally, teaching SL courses involves a continuing quest for the instructors to improve their personal teaching skills, particularly in fine tuning the instructors' abilities to facilitate the guided reflection so necessary to maximize the students' educational value of the SL experience. Finally, SL experiences will be brought into other courses in the Quinnipiac University CIS curriculum as we strive to optimize our students' collegiate experience while simultaneously providing college graduates prepared to serve both their employers and their communities.

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