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In this issue:

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Creating Significant Learning Experiences in Systems Analysis & Design: Towards a Service Learning Paradigm

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Abstract

This paper proposes creating "significant" learning experiences for our students by employing a Service Learning paradigm in Systems Analysis and Design. "Significant" learning is defined and Fink's Significant Learning paradigm is presented. Course objectives for Systems Analysis and Design are posited and the weaknesses of traditional approaches, including case studies, are discussed. Service Learning is defined, the roots of Service Learning are explored, and reasons are given for using Service Learning for today's college students. The Albert Schweitzer Institute is described, and results of using a Service Learning approach in Systems Analysis and Design via the Albert Schweitzer Institute are presented. It is shown how "significant" student learning occurs via using a Service Learning approach and directions for future course development are proposed.

Keywords: Significant Learning, Service Learning, Systems Analysis & Design

1. WHAT IS "SIGNIFICANT" LEARNING?

One of the first 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 learning 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 – an 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. No change, no learning. For Fink, "significant" learning *requires* that there be some kind of *lasting* change that is important in terms of the learner's life.

2. ON THE NATURE OF SYSTEMS ANALYSIS & DESIGN

Most *Systems Analysis & Design* courses begin with the view of a system as a group of interrelated, goal-directed procedures. Systems are candidates for study and improvement when a *systems problem* arises; that is, when someone who interacts with or uses the system perceives a difference between the way things are (what *is* happening) and the way things ought to be (what *should be* happening). The goal of the analysis and design process is to improve the way things are, to foster continuous quality improvement of organizational processes and consequently of organizational systems.

The analysis process is typically broken down into a series of *phases*, each of which is designed to produce a *deliverable*. In the workplace, phases are conducted by *project teams* and continuation decisions regarding a systems project are typically made at the end of each phase by some form of *steering committee*. Typically the initial phase examines the *feasibility* of doing the project in technical, economic, and organizational terms. The second phase produces a *general design* of the proposed solution focusing on *what* must be accomplished to improve the business system. The third phase produces a *detailed design* of the new system, focusing on *how* the new system is to be built to accomplish the desired changes (the *what* from the second phase). The fourth phase produces a totally functional system.

The solution to any systems problem is usually thought of to take on one of three distinct yet somewhat interrelated forms: (1) *Business Process Automation,* in which we do not substantively change the function of the system processes but seek to automate some or all of the existing processes; (2) *Business Process Improvement,* in which the goal is to improve the business processes by introducing some moderate changes which are generally incremental or evolutionary in nature; or (3) *Business Process Reengineering,* which seeks to radically redesign business processes to achieve dramatic improvements in system performance measures such as cost, quality, speed, and/or service.

The learning objectives of the Systems Analysis and Design course are as much about teaching a process for continuous improvement as they are about obtaining an end result. Though we seek to have the students produce useful deliverables, we are at least as concerned with their ability to work through a procedure involving both technical and human dimensions in a team environment in a realistic time frame. We can no more teach Analysis & Design without having our students do Analysis & Design than we can teach our students swimming without having them get in the water. We want them to actively be able to do Analysis and Design in as real an environment as possible.

3. RESOURCES FOR THE ANALYSIS & DESIGN COURSE

Typical resources available to teach the *Systems Analysis & Design* course include a text augmented by a web site and/or a CD-ROM. The web site usually includes both instructor resources and student resources. Instructor resources include such items as PowerPoint slides, examination questions in a variety of formats, links to other web sites, etc. Student resources on the web typically include review questions, hypertext links to various web resources to elaborate on the course topics, and sample deliverables. The text and web site are frequently augmented by a student CD-ROM that includes some form of project management software and sample deliverables. Students have a natural tendency to focus on how to use the project management software rather than engage in the process of analysis and design, and employing such software can put the course at risk of turning into a software course unless the instructor is careful to plan otherwise. Another problem with such a course is that students are not *doing* analysis and design. In particular, viewing PowerPoint slides is a passive rather than an active learning mode, and examinations typically measure what students can memorize rather than what they can do.

Case studies are frequently introduced to augment such a course and move it from the passive to the active learning mode which attempts to have students do analysis and design. Since their introduction at Harvard Law School in the late 19th century, case studies have been used in a number of disciplines across the academic spectrum. They can range from a highly structured exercise to a very unstructured problem that could raise a variety of complex issues and alternative solutions. Typically, case studies are written objectively and include a brief overview of the situation along with descriptive information that both establishes a context for the problem and identifies the major decisions that must be made.

While a step in the right direction, case studies in themselves are fraught with limitations. In particular, the case study environment is at best incomplete and cannot substitute for (1) the absence of real people with vested interests in the system because of their roles either as users or clients of the system, (2) the time and space continuum that a real system occupies, (3) the presence of office politics and its influence on the range of legitimate solutions, etc. To offset these people issues, instructors and/or students are encouraged to "role play" to vicariously experience situations that may be encountered in the future. But even the most effective role player is no substitute for the presence of a real person. At their very best, case studies only simulate reality.

In previous semesters the author has provided students with "real-world" active learning experiences by using the Quinnipiac University campus as a learning laboratory for systems analysis and design. Students have thus gained exposure to analysis and design principles by actively providing a service to the Quinnipiac University community. Past projects have included on campus housing assignment, off campus housing assistance, registration, developing a college-wide schedule of courses, developing a master system for scheduling room usage on campus, developing an on-line alternative to used book sales/purchases, etc. Real benefits have been achieved in that many of the student-designed systems are currently in place at our university.

4. ON THE NATURE OF SERVICE LEARNING

Service Learning (SL) is an educational process/paradigm which 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 helps meet real community needs, as identified by the community partner, and leavings 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.

5. THE ROOTS OF SERVICE LEARNING

Service Learning builds on the tradition of activism and volunteerism in higher education that was popular in the sixties but which gradually subsided during the seventies and eighties. But the goal of SL differs from those of volunteerism, community service or activism in that SL seeks to empower those whom we serve. The tradition of volunteer service saw a rebirth in the late eighties as cultural, educational, and civic leaders challenged those in higher education to fulfill its historic mission and promote civic responsibility. Many colleges and universities accepted this challenge and created a support network – the Campus Compact – to develop and promote SL as a pedagogical strategy, and SL has now become a national movement.

The academic parent of Service Learning is experiential learning. As in all types of experiential learning – cooperative education, internships, volunteerism – SL directly engages the learner in the phenomena being studied with the expectation that richer learning will result. The critical difference and distinguishing characteristic of SL is its threefold emphasis: (1) enriching student learning, (2) revitalizing the community, and (3) focusing on issues of social justice, culture and society as a whole. To accomplish this, effective SL initiatives involve students in course relevant activities which address the real safety, economic, educational and environmental needs of the community. Moreover, SL approaches assume that the community must define its own needs, and that students can participate in the community's processes of self-government. Students' course materials – texts, lectures, discussion and reflection – inform their service. Students' service experiences are brought back to the classroom to inform the academic dialogue and the quest for knowledge. This reciprocal process is based on the logical continuity between experience, knowledge and public participation.

In Service Learning courses, real life exposure dominates the classroom as students' service experiences provide the content for purposeful dialogue leading to real understanding of academic concepts. Most conventional pedagogies are abstract and deductive, relying on presenting theory and then encouraging application to specifics. In contrast, SL is more inductive, using experience provided by students to lead to conceptual or theoretical understanding. SL is best understood in the context of a continuous learning cycle where meaning is created through concrete experience, reflection or assimilation, abstract conceptualization or theory building, and active experimentation or problem solving.

Learning is not a predictable linear process. It may begin at any point in the Service Learning experience. Students may have to apply their limited knowledge in a service situation before consciously setting out to gain or comprehend a body of facts related to that situation. The discomfort experienced from the lack of knowledge may encourage further accumulation of facts or the development and/or changing of a personal theory for future application. To assure that this kind of learning takes place however, skilled guidance in reflection about the experience must occur. This facilitation of reflection is the critical responsibility of the SL teacher.

The pedagogy of Service Learning represents a substantial change from the traditional lecture driven, content based, and faculty centered curriculum. SL education is a process of living, not a preparation for life. SL rejects the notion that students are empty vessels waiting to be filled. In a culture characterized by information overload, effective teaching must encourage information processing as well as accumulation. In a complex society, it is almost impossible to determine what information will be neces-

sary to solve particular problems. All too often, the content in which students learn in class is obsolete by the time they have finished their degree. Thus, it becomes much more important to "teach students how to fish" than to "feed them".

Service Learning provides students with real-life, meaningful experiences which by their very nature force critical thinking. In service, students encounter events that may conflict with their assumptions. They deal with issues or incidents that challenge familiar competencies and/or understandings. These experiences create perplexity or dissonance, which is often the beginning of learning.

6. WHY SERVICE LEARNING FOR TODAY'S COLLEGE STUDENTS

College students say they are looking for new ways to get involved in the community and 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 other 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.

7. THE ALBERT SCHWEITZER INSTITUTE

The Albert Schweitzer Institute is a non-profit organization, based at Quinnipiac University in Hamden, CT, that conducts US and international programs that link education, ethics and voluntarism. Programs focus on health, humanitarian, and peace efforts; they support healthcare development in under-served areas; motivate young people to serve the community and the environment as a way of life; and increase public awareness of Dr. Schweitzer's philosophy and its potential for a more peaceful and sustainable world.

Inspired by Albert Schweitzer's exemplary humanitarian service and concepts of "Reverence for Life," the Institute conducts education programs that teach young people ethical values and encourage their commitment to community service in the United States and abroad.

The Institute's main program activity in health care is the Schweitzer Conferences and Seminars Series for health care leaders held in Central and Eastern Europe and in countries of the former Soviet Union. These conferences explore clinical, public health, human rights and ethical issues in order to foster health care initiatives that improve the lives of underserved populations.

Founded in 1984 as the Albert Schweitzer Memorial Foundation, the Institute's offices are located on the campus of Quinnipiac

University Hall in Hamden, Connecticut. Over the years, the Institute has organized conferences, lectures and workshops, sponsored fellowships and awards, provided humanitarian aid to developing countries, and publicly advocated for human rights, the environment and world peace.

8. SERVICE LEARNING IN SYSTEMS ANALYSIS & DESIGN VIA THE ALBERT SCHWEITZER INSTITUTE

In the Spring of 2003 the author expanded the "real world" approach to teaching and learning systems analysis and design by moving the application area beyond the confines of our campus to a SL format by providing assistance to not-for-profit community-based organizations. Although not totally successful in that a critical mass of SL projects was not achieved for the initial semester, several project teams did in fact engage in SL projects.

The most striking positive result achieved was providing a web presence for the Albert Schweitzer Institute. The web presence may be viewed on line at the following URL:

http://faculty.quinnipiac.edu/Schweitzer/

The web site provides a "flash" introduction featuring several of Albert Schweitzer's quotes, a biography of Albert Schweitzer, pictures of Schweitzer's artwork depicting his work in Gabon and Haiti, links to other Schweitzer affiliations, a calendar of events of the Albert Schweitzer Institute, and vehicles to both provide financial support to and contact the institute. The home page also provides a link to a PowerPoint presentation that David Ives, the Institute's Executive Director, can employ while making community presentations regarding the work of the Institute.

9. SIGNIFICANT LEARNING VIA SERVICE LEARNING IN ANALYSIS & DESIGN

It is much too early in this process to conclusively state that "significant" learning has occurred by employing Service Learning in Systems Analysis and Design. However, one may posit that significant learning has occurred as follows:

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. Details of the course structure may be found at the course web site,

http://mywebspace.quinnipiac.edu/saulnier/CIS 370 Home Page.htm

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 are providing 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.

10. CONCLUSIONS

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 issue of how best to deliver the course content to both maximize student learning of content while simultaneously addressing larger societal and educational issues. The use of a Service Learning approach to the teaching of Systems Analysis and Design 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 while involve seeking out additional not for profit community-based agencies for whom service can be provided and fine tuning the instructors ability to facilitate the guided reflection so necessary to maximize the educational value of the SL experience.

11. REFERENCES

Bloom, B.S., ed., 1956, Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook I: Cognitive Domain. McKay Publishing, New York.

Campus Compact, 2001, "Integrating Service with Academic Study". *http://www.compact.org/faculty/isas2001.html*

Fink, L. Dee, 2003, Creating Significant Learning Experiences. Jossey-Bass, San Francisco.

Light, Richard J, 2001, Making the Most of College. Harvard University Press, Cambridge.

Quinnipiac University, 2002, "Service Learning". *http://www.quinnipiac.edu/x3537.xml*

Saulnier, Bruce M, 2001, **"**The Campus as "Learning Laboratory" for Systems Analysis & Design. " Proceedings of ISECON '01.

Weimer, Maryellen, 2002, Learner-Centered Teaching. Jossey-Bass, San Francisco.

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