

Service Learning in a Systems Analysis and Design Course

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Abstract

Systems Analysis and Design courses are usually centered on team projects. Such projects, if chosen with care, can meet the goals of the course and serve clients from the campus community. This paper discusses how such projects could be selected. Specific examples of both projects which worked and projects which did not are included.

Service Learning

The Corporation for National and Community Service defines service learning programs as ones that provide educational experiences in which students learn through active participation in organized service experiences which meet actual community needs. The Corporation envisions a nation in which service is promoted and valued by educational organizations (among many others), and problems in communities are solved in part through problem solving initiatives in education[1]. The key to making service learning opportunities both valuable and educational is cooperation between the community organization being served and the academic unit planning the learning activities. A Systems Analysis and Design course which involves team projects can certainly provide the educational framework for information systems development. If the projects are selected with care, they may well also provide real service to the community.

Basic Parameters

Students who work through a standard text in Systems Analysis and Design are presented with a great deal of information. As the authors of one such text point out, students really need to practice the application of concepts, not just read about the application of concepts[2]. Team projects provide a golden opportunity to do this, although time may limit what is possible. At Saint Mary's, this course is a one semester course. Hence fully implemented solutions to projects are not usually possible, but complete prototypes are quite appropriate. When a full year is devoted to the course, more complete projects solutions are possible. An additional basic decision about the source of the projects also must be made. At Saint Mary's, students would find it difficult to work extensively with off campus clients, due both to time and location. Hence we have decided to serve on campus clients through the projects selected.

Learning Objectives

Any service learning project must begin with well defined learning objectives. A systems project is no exception. At Saint Mary's, the Systems course is expected to provide students with experience in analyzing and designing an entire system in a cooperative team environment. Stu-

dents learn about information systems, the system development life cycle and methodologies used to implement the life cycle. Students also must learn how to communicate with clients whose are not computer savvy, analyze their current system, propose new systems, and write and test a prototype of the new system.

Project Selection

Any academic community has many individuals, departments and divisions with information systems needs. These needs range from getting computer shy individuals comfortable with the technology they must use to major systems redesign in such areas as the admission department, the registrar's office and financial offices. The projects needed for a Systems course need to meet the learning objectives of the course, but they can also provide real service to some of the groups in need on campus. Student projects at Saint Mary's must follow a series of milestones; the credit for this organization belongs with Prof. Peter Smith (ASCUE Public Relations Director), who designed the course. The required milestones are as follows:

1. A project proposal, including a letter of transmittal and an abstract for the project.
2. A project charter, including a problem statement explaining why the system is needed by the requesting department. The charter also addresses the initial scope of the project, the project vision, business and technology constraints, and the methodology to be used. Also included are the interview guide prepared for the initial interview with the system owner and a follow up memo to the interviewee.
3. A problems, opportunities, objectives and constraint matrix.
4. Data modeling. An entity relationship diagram forms the heart of this milestone.
5. Development of a context data flow diagram and a functional decomposition diagram.
6. Process modeling. This milestone includes a use case list, the event decomposition diagram, event data flow diagrams and a system diagram.
7. A full system proposal. This proposal includes a feasibility study of the alternative solutions and includes design units which document the general design of the system.
8. Input and Output design.
9. User interface design.
10. A technical and professional report, made to the client with questions asked both by the client and the course instructor.

With the right project, these milestones guarantee that students achieve the learning objectives of the course. However, projects must be selected with care.

This presents the instructor of the course with a two fold challenge: find projects which will meet the learning objectives and at the same time provide real service to some members of the community. The instructor at Saint Mary's began the hunt for projects by sending an e-mail to all faculty and staff. The note began by asking if the reader would like to rethink how the work flows in the reader's department, division or group. Does the reader have an uneasy feeling that there are better ways to handle the information system used, perhaps making use of technology, but is sure that he/she does not have the time needed to explore this? The note went on to explain the course and that there would be teams available to work with campus clients, examining their business requirements and designing information systems which would meet those requirements. The note explained the time commitment on the part of the client and explained that

student teams would be developing prototypes by the end of the semester. This invitation produced a minor flood of ideas and proposals, ranging from “We need help!” to rather well thought out descriptions of current problems. Part of the service to the community involves helping those whose projects are not really suitable find the help they need. This past year at Saint Mary’s, that was possible in most cases. Proposals which were not accepted included one which was essentially just a web page design project and one which was essentially a data base design project. The instructor spent some time directing those whose projects could not be used to possible other resources on campus. In a couple of other cases, projects came in too late to be used this past year but are possibilities for subsequent years. The selected projects were ones in which the student teams could experience all phases outlined in the milestones, beginning with conversations with the client about the client’s information needs.

Examples of Projects

This past year there were three student teams at Saint Mary’s; hence three projects were selected. The client for one of the projects was the Center for Spirituality at Saint Mary’s. This office runs multiple programs for students, faculty and staff and people from outside the College. There are multiple sources of funding, depending on the program; hence the office has to keep track of multiple budgets. The office also needs to keep information on people interested in their programs. The Director requested help with updating the whole mailing system and implementing a different marketing strategy. She also needed help overhauling the budgetary organization and developing one systematic way of formulating a time-line for each project. The Director wrote a page explaining her needs, which was given to a student team at the beginning of the project. This team worked with the Director over the semester and was able to develop a new system for her, which her office was able to implement. Of the three projects, this one was probably the most successful in terms of real service to the client and appropriate learning for the students. The team needed to go through all the phases outlined in the milestones, starting with interviewing the client to get a better understanding of the needs. Even that first conversation started the creative juices of the students flowing; they came up with good ideas and earned the gratitude of the client.

A second project had a single faculty member as a client. The professor of Art History at Saint Mary’s was on sabbatical with a golden opportunity in front of her. An alumna had just donated funding for ArtStor, a 300,000 digital image library. Up until this year, art history courses has been taught with 35 mm slides, chosen from a department collection of about 40,000 slides. The time required to make the slides, pull them from the collection, arrange them and then refile them has been enormous. The client wanted help making the transition from the 35mm collection to the digital image library. Both the client and the student team working on the project identified many areas of concern. Not only were there questions about how to integrate ArtStor images, scanned images from the slide collection and images from the client’s personal collection, but there clearly were technical computer questions to be considered. The client was concerned about the reliability of the network for classes; what would happen if the entire class presentation was stored on the network and the network failed just as class started? The first challenge for the project team was to become familiar with the old scheme of class preparation and with the capabilities of ArtStor. Since ArtStor is relatively new, the student team had frequent e-mail exchanges with those in charge of ArtStor as they attempted to resolve problems. At one point

the team uncovered a problem that ArtStor had not known about; the team unexpectedly ended up serving a client beyond the campus! Although the project was quite successful and the client went on the next semester working on implementation, it was not the perfect project for the course. A great deal of the student time was spent working with the new software and learning how to put presentations together; some of the process modeling that should be part of a project did not really apply to this project.

The third project was actually one held over from the last time the course was offered. One of the members of the mathematics faculty frequently runs regional conferences for the National Council of Teachers of Mathematics. Over the years he has been frustrated by the way in which information about presenters and their topics has been organized. The system in use has made it difficult to locate quickly all the information a presenter might need in advance. For example, to answer a question from a presenter about the assigned room or time, he might have to sort through all the numbered proposals. Since these are large conferences, a better system was indicated. It was clear from the beginning of this project that the team could only make suggestions; the information was recorded in a national office, not in the office of the campus client. It would be up to the client to pass along ideas for changing the system. This team had more trouble with this project; in retrospect, it really is more suitable as a database project. Nevertheless, the team did go through all the milestones and present possible solutions to the problems. Again, this team had much more data modeling work to do and less process modeling. In terms of service learning, the team probably provided less service to the client than the other two teams.

Assessment

As a result of surveying the campus for ideas, the instructor was able to get a much better idea of the service needs of many groups and individuals on campus. The projects selected this past year clearly demonstrated the need to look carefully at each proposal to be sure that the information systems being explored and changed require both data design work and process design work. Although client contact was increased over a previous offering of the course, the instructor feels that even more direct consultation between the team and the client is necessary. The client in the ArtStor project was particularly helpful in exchanging ideas and information, and she was quite grateful for the work of the student team. The other two teams should have spent more time with their clients. Although we can not promise more than a student team can deliver, it seems clear that there is a golden opportunity to be of real service to the community while achieving the desired learning objectives. Combining service to the community with student learning is the heart of service learning. The instructor is excited by uncovering even better projects for the next offering of the course, both because the student learning is so effective and because the students can begin to serve the community in which they live and work.

References

1. <http://www.nationalservice.org/about.vision.html> Corporation for National and Community Service.
2. Systems Analysis and Design Methods. Whitten, Bentley and Dittman. McGraw-Hill. 2004.