CHAPTER 1

A FRAMEWORK FOR SERVICE-LEARNING IN THE COMPUTER AND INFORMATION SCIENCES*

Brian A. Nejme

ABSTRACT

There are substantial opportunities for service-learning in the computer and information sciences. To date, there has not been a comprehensive framework developed to provide a structure for understanding the breadth and depth of service-learning opportunities in the computer and information sciences. This framework delineates the range of options and opportunities for service-learning in the computer and information sciences disciplines. Its aim is to facilitate and broaden the practice of service-learning in the computer and information sciences among the academic and nonprofit organization communities by clarifying the options and choices open to stakeholders in these opportunities. This chapter proposes a three-dimensional framework for service-learning opportunities in the computer and information sciences. The first dimension defines the types of projects to be performed in a service-learning engagement (i.e., training, professional services, systems selection, support/help desk, custom development projects, and product development projects). The second dimension defines the range of activity (i.e., research, analysis, design, implementation, test, transition, and assessment) to be performed in a service-learning project. The third dimension defines the mode (co-curricular, curricular, or hybrid) of performing the service-learning project.

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1.1 INTRODUCTION

The mission of many colleges and universities includes some notion of service to the local, national, or global community. The incorporation of the service-learning model into the course curriculum and cocurricular activities can greatly enhance the service-oriented mission of many colleges and universities. Despite this fact, service-learning courses and cocurricular activities have only recently emerged in the computer and information sciences disciplines (i.e., computer science, information systems, computer engineering, software engineering, etc.). These disciplines, however, have significant opportunities for engagement in service-learning. Many community non-profit organizations (NPOs) simply lack the ability, resources, and capacity to leverage information technology (IT) for the betterment of their organizations and the communities they serve.

The purpose of this chapter is to demonstrate that the computer and information sciences disciplines offer significant opportunities for meaningful service-learning engagement. This is done through the definition and presentation of a comprehensive framework for service-learning (SL) in the computer and information sciences (CIS). This framework outlines the breadth and depth of service-learning opportunities available within the computer and information sciences disciplines. We use the term “SL in CIS” throughout the chapter to refer to “service-learning in the computer and information sciences.”

The service-learning framework for the computer and information sciences disciplines defined in this chapter will serve to inform its educators in these disciplines about the range of opportunities available to engage in service-learning. This is an important contribution to disciplines in which such a framework has yet to emerge and relatively little service-learning engagement occurs. This framework will serve to broaden the awareness of SL in CIS within the academic and NPO communities. As a result, a goal of this framework is to increase the volume and scope of SL in CIS as NPO leaders, deans, department chairs, faculty, and students become more aware of the vast array of possibilities for service-learning. The framework also provides a great planning tool for NPOs and academic partners as they consider how to best discover and articulate the IT needs of NPOs. The framework provides a lexicon or a vocabulary for beginning this discovery and articulation process. It allows NPOs and their academic partners to map out the evolution of their work over time across multiple projects.

1.2 BACKGROUND AND RELATED WORK

Historically, service-learning in the academy has been focused predominately outside of the computer and information sciences [1]; however, service-
learning projects in the computer and information sciences have emerged over the past decade. Most of these efforts focus on the development of custom software to meet the specific needs of an NPO. For example, a service-learning project at Trinity College [2] involved students developing a system for managing disaster relief for an NPO. Another service-learning project focused on providing additional information technology (IT) support for school districts [3]. Another project [4] focused on the development of a course outline that incorporated service-learning into a computer science course. Similarly, another institution outlined a capstone project in information systems that focuses on community-based projects [5]. Finally, a panel session [6] outlined the opportunities and challenges for service-learning in the computer and information sciences. This review of the related work proved invaluable in the creation of the service-learning framework defined in this chapter. Consequently, each of the projects identified in the literature can be positioned within the framework.

Although the recent activity in service-learning in the computer and information sciences disciplines is encouraging, it is still limited compared to such projects in fields outside of computer and information sciences. Furthermore, no known service-learning framework exists for the computer and information sciences that outlines the breadth and depth of service-learning opportunities available to the disciplines.

From 2002 to the present, the author and others at Messiah College have been actively involved in service-learning projects in the computer and information sciences. Appendix A summarizes the wide range of service-learning projects being done in the computer and information sciences at Messiah College. In addition, the author participated in a multiyear task force funded by a Lilly Foundation grant, involving an interdisciplinary team of faculty focused on the definition of a service-learning framework. This project was informative regarding the essence of service-learning as practiced in disciplines other than the computer and information sciences. Collectively, these service-learning project experiences, as well as the interdisciplinary service-learning task force participated in by the author, provided the initial basis for the computer and information sciences framework defined herein.

The author began working on this book in March of 2010. Through his literature review and interactions with prospective authors, the need to enlarge the scope of the initial service-learning framework became apparent. In particular, the author realized the following:

- Project Mode. It became clear that much community service is being done outside the context of a formal course structure in a university setting. Such projects are happening in the context of service organizations on campus, such as student chapters of Engineers Without Borders [7] and student chapters of the ACM (Association for Computing
Machinery) [8]. Although such cocurricular activity is typically termed community service within the academy, such activities are going to be considered part of service-learning for purposes of this book.

- Multifaceted Projects. Projects that span more than one project type, activity range, and mode. It also became clear that many SL in CIS projects are difficult to pigeonhole into one project type, activity range, or mode. For this reason, the framework allows a project to be classified across multiple project types, activity ranges, and modes.

The framework for SL in CIS was modified to reflect these realities.

### 1.3 WHAT IS SERVICE-LEARNING IN THE COMPUTER AND INFORMATION SCIENCES?

At Messiah College, "service-learning is a pedagogical model that intentionally integrates academic learning with community service in a credit-bearing academic course. Students participate in an authentic service activity that meets needs identified by the community (designed within the framework of a mutually beneficial relationship), and critically reflect on that activity. Thus, students gain a deep understanding of course content, a commitment to socially responsible citizenship, and develop skills and understanding needed to contribute to civic well-being" (italics added) [9].

The critical elements of service-learning are content, service, and reflection [9]. In the context of the computer and information sciences, the author's experience is that content should be focused on readings, visuals, and class discussion that specifically relate service to the course objectives. A reading example could include excerpts from Bryant Myers' book, *Walking with the Poor* [10]. Visuals could include video, photographs or Web resources (blogs, twitter, etc.) that offer the students an opportunity to learn more about the communities they will serve and how their work can potentially impact the communities. Class discussion is used to amplify the relevance of service to the course in discipline-specific ways. This might also include an in-class discussion with a staff member from the NPO who is the partner for the service-learning project.

The author's experience is that service in the computer and information sciences should be oriented toward specific projects that address significant information technology needs of NPOs. Such needs cover a wide range of activities spanning the development of information systems to the installation of a computer network (see Appendix A and the chapters throughout the book). The range of service opportunities in the computer and information sciences is discussed in detail later in this chapter.
The author's experience is that reflection in the computer and information sciences should focus on guided journaling done by the students. Journal topics should relate the students' service experience to their vocation, community outreach, and responsible stewardship with the resources entrusted to them. In the author's experience, this is typically done via journal prompts that are provided to the students by the faculty member about every two weeks. Key issues that students should be challenged to ponder and reflect on include:

- What is the nature of the problems the NPO is facing and why do these problems exist?
- How can information technology (IT) be used to positively impact the NPO in order for it to better meet the needs of the community it is serving?
- How does indirect service through the application of information technology allow an NPO to better directly serve the needs of their communities?
- Comment on your understanding of how indirect service through an application of information technology to support an NPO can allow an NPO to better directly serve the needs of the communities they serve?
- How might someone be able to continue to serve NPOs and, in turn, the communities they serve beyond this service-learning project?

In one of the above questions, the phrase indirect service appears. This phrase has proven to be an important term to students. Most students in the computer and information sciences struggle to understand how their talents can be used in a community-service setting. They tend to see direct, hands-on community service as the only form of community service. The notion of indirect service is that you are serving an NPO indirectly by providing them with IT systems and assets they can, in turn, use to increase both their capacity and ability to better directly serve their communities of need. Hence, indirect service leads to IT systems that improve the overall operational efficiencies and effectiveness of NPOs, thereby allowing NPO staff and volunteers to have more time to directly serve their communities in need. In effect, this concept of indirect service and its linkage to direct service outcomes helps students better understand how their talents can be used to the benefit of NPOs and the communities they serve.

1.4 BENEFITS OF SERVICE-LEARNING IN THE COMPUTER AND INFORMATION SCIENCES

The author's experience points to several key student benefits of service-learning in the computer and information sciences. Student reflection jour-
nals confirmed the significant benefits that service-learning offered them. A summary of the key student benefits follow:

- Applied experience. Many students in the computer and information sciences long to engage in the process of solving practical problems with information technology. Service-learning experiences allow students to practice problem solving with an actual customer and organization. Such experiences also provide students the chance to apply the technology they have learned in theory, but have not had the chance to apply in practice.

- Ethics. Service-learning experiences also allow students to address ethical issues such as software licensing, pricing, and vendor claims of product functionality and performance. Such experiences offer the opportunity for students to practice clear and honest communication with a customer.

- Professionalism. Students performing service-learning projects get to practice professionalism in the form of meeting planning, presentation development, project deadlines, and trade-off analysis.

- Teams. Students are given the opportunity to work in teams as they perform service-learning projects. This is a critical skill that students must develop as they transition from college into the workplace.

- Trade-off analysis. Service-learning projects provide practical experiences for students to perform various forms of trade-off analysis. Such trade-off analyses include cost–benefit analysis, time–space analysis, design with change in mind analysis, cost–schedule–functionality trade-off analysis, and so on.

- Project management. Service-learning projects allow students to practice and develop project management skills related to project planning, estimation and scheduling as well as communication and coordination. In general, such projects allow for the development of key interpersonal skills students will need to succeed in the workplace.

- Diversity. Students often get to experience and see diversity as they work with NPOs. Diversity occurs as students interact with people that are different from themselves in terms of socioeconomic status, race, ethnicity, and location around the world.

- Compassion. Students can also come to appreciate the adversity that comes with being poor, disabled, or uneducated as they work with the NPOs that minister to people from such groups.

- Vocational exploration. Service-learning projects offer students the opportunity to explore their vocation, both in terms of the different types of organizations and the functional roles they would like to play within an organization.
• Culminating experience. Students often look at service-learning projects as the culminating or capstone project of their educational experience. These projects are often referenced to employers and others as a "rite of passage" into the workplace.

The author's experience also indicates that NPOs benefit from service-learning in the computer and information sciences. Such projects improve the overall efficiency, effectiveness, and value of NPOs. These projects lead to improved marketing, fund-raising, communications, service quality, and increased capacity.

1.5 A SERVICE-LEARNING FRAMEWORK FOR THE COMPUTER AND INFORMATION SCIENCES

Having established the relevance of service-learning in the computer and information sciences, a framework for service-learning in the context of these disciplines is needed to raise the awareness of the opportunities of SL in CIS for NPOs and academic partners. In turn, the framework can increase the scope and volume of practice of SL in CIS. Many disciplines in the academy have embraced service-learning for some time [1, 11]. Several generic frameworks have been developed to help inform the academy about the forms of service-learning. For example, Musil developed a service-learning taxonomy and maturity model around levels of engagement and authenticity [12]. As discussed earlier, service-learning in the computer and information sciences has emerged in this past decade; however, service-learning projects in the computer and information sciences are still in their formative stages and are still limited in number compared to such projects in fields outside of the computer and information sciences. Furthermore, no known service-learning framework exists for the computer and information sciences.

The framework refines existing pedagogical models to fit the computer and information sciences disciplines. The framework defined herein is based on:

1. Actual service-learning experiences (see Appendix A) performed in the computer and information sciences disciplines at Messiah College
2. An extensive review of the SL in CIS literature
3. The projects described in this book

The framework defines a three-dimensional space:

• Project Type. The first dimension defines the types of projects to be performed in a service-learning engagement.
• Activity Range: The second dimension defines the range of activity to be performed in a service-learning project.
• Project Mode. The third dimension defines the mode of performing the service-learning project.

1.5.1 Project Types

The first dimension of the framework is the project type. A project type defines the work to be performed in the context of a service-learning engagement. In terms of types of projects that can be to be performed, the framework defines the following service-learning options:

• Training. Focus on imparting computer and information sciences skills needed by the staff of NPOs.
• Professional services. Focus on providing advice in computer and information sciences issues facing NPOs.
• Systems selection. Focus on defining system needs of an NPO, identifying and evaluating candidate solutions, recommending a solution, and (potentially) transitioning the solution to an NPO.
• Support. Focus on providing customer support related to systems for NPO(s).
• System projects. Focus on developing an information system project for a specific NPO.
• Products. Focus on developing a common information system product used by many NPOs.

Table 1.1 more completely defines the project types for service-learning in the computer and information sciences. For each project type, the table:

• Defines the focus or nature of the project type
• Outlines the level of engagement typically required on the part of faculty–student teams to perform this project type
• Describes the key skills required to perform the project type
• Provides an example of the project type

1.5.2 Activity Range

The second dimension of the framework is activity range. Activity range defines the span of tasks completed in the context of a service-learning engagement. In terms of the activity range to be performed, the framework defines the following:

• Research. Spans the tasks of problem identification and concept definition.
Table 1.1. Computer and information sciences service-learning project types

<table>
<thead>
<tr>
<th>Project type</th>
<th>Focus</th>
<th>Engagement level</th>
<th>Key skills</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training</td>
<td>Focuses on imparting knowledge or skill needed by the staff of NPO(s).</td>
<td>Low</td>
<td>Subject matter expertise (SME), training development</td>
<td>Microsoft Office® training for NPOs</td>
</tr>
<tr>
<td>Professional services</td>
<td>Focuses on providing expert advice on computer and information sciences issues facing an NPO.</td>
<td>Medium</td>
<td>Problem solving, SME</td>
<td>Strategic IT Advisory Board for a NPO</td>
</tr>
<tr>
<td>Systems selection</td>
<td>Focuses on defining the system needs of an NPO, identifying candidate solutions, evaluating identified solutions, recommending a solution and transitioning the solution to an NPO.</td>
<td>High</td>
<td>Requirements analysis, consulting, product research and evaluation, product installation</td>
<td>System analysis, selection and installation of donor management system for an NPO</td>
</tr>
<tr>
<td>Support/help desk</td>
<td>Focuses on providing customer support related to an application or system for NPO(s).</td>
<td>Medium</td>
<td>SME, listening, troubleshooting.</td>
<td>Providing support for local area network for NPOs</td>
</tr>
<tr>
<td>Custom development projects</td>
<td>Focuses on the full life cycle development of a custom application for an NPO.</td>
<td>High</td>
<td>Software development, project management</td>
<td>Integration of bar-code system with asset-management system</td>
</tr>
<tr>
<td>Product development projects</td>
<td>Focuses on the full life cycle development of a product application that is common to several NPO(s).</td>
<td>High</td>
<td>Software development, project and product management</td>
<td>Impact-assessment portal for NPOs</td>
</tr>
</tbody>
</table>

- Analysis. Analysis spans the tasks of requirements discovery, documentation, and validation of a business process or system.
- Design. For the systems selection, custom development, and product development project types, design spans the tasks of architecture, database design, user-interface design, communications design, workflow design, and report design. For the training, professional services, and support/help desk project types, design involves outlining the solution strategy to be used to address the requirements established during the analysis activity.
• Implementation. For the systems selection, custom development, and product development project types, implementation spans the tasks of detailed design and implementation of a system. For the training, professional services, and support/help desk project types, implementation involves developing the actual solution outlined during the design activity.

• Test. For the systems selection, custom development and product development project types, test spans the task of integration of system and user-acceptance testing of a system. For the training, professional services and support/help desk project types, test involves internally validating that the actual solution developed during the implementation activity meets the needs of the NPO.

• Transition. For the systems selection, custom development, and product development project types, transition spans the tasks of installing a system and migrating from the old system to the new system. For the training, professional services, and support/help desk project types, transition involves delivering to the NPO the actual solution resulting from the testing activity.

• Assessment. Assessment spans the tasks of performance, usability, efficiency, effectiveness, and value/impact assessment of a system (i.e., the result of a system selection, custom project, or product development project type), for a training, professional services engagement, or support/help desk project. For training, professional services engagements, or support help-desk projects, assessment involves understanding the efficiency, effectiveness, and value of the services delivered by the project team.

Table 1.2 defines the activity range for service-learning.

1.5.3 Project Mode

The third dimension of the framework is mode of project. Mode defines the academic context and manner in which the service-learning engagement is being performed. In terms of the mode of project, the framework defines the items listed in Table 1.3.

1.5.4 Putting It All Together: The SL in CIS Framework

Structurally, the service-learning framework forms a three-dimensional space of project types, activity ranges, and project modes. A specific service-learning project is placed in one or more cells of the matrix. Table 1.4 follows and depicts the full computer and information sciences service-learning framework. This table has not been populated with sample projects, but simply demonstrates the skeletal framework. Table 1.5 has been populated with representative projects completed at Messiah College over the past
### Table 1.2. Computer and information sciences service-learning activity range

<table>
<thead>
<tr>
<th>Scope</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Research</td>
<td>Spans the tasks of problem identification and concept definition.</td>
</tr>
<tr>
<td>Analysis</td>
<td>Spans the tasks of requirements discovery, documentation, and validation of a business process or system.</td>
</tr>
<tr>
<td>Design</td>
<td>For the systems selection, custom development, and product development project types, design spans the tasks of architecture, database design, user interface design, communications design, workflow design, and report design. For the training, professional services, and support/help desk project types, design involves outlining the solution strategy to be used to address the requirements established during the analysis activity.</td>
</tr>
<tr>
<td>Implementation</td>
<td>For the systems selection, custom development, and product development project types, implementation spans the tasks of detailed design and implementation of a system. For the training, professional services, and support/help desk project types, implementation involves developing the actual solution outlined during the design activity.</td>
</tr>
<tr>
<td>Test</td>
<td>For the systems selection, custom development, and product development project types, test spans the task of integration of system and user-acceptance testing of a system. For the training, professional services, and support/help desk project types, test involves internally validating that the actual solution developed during the implementation activity meets the needs of the NPO.</td>
</tr>
<tr>
<td>Transition</td>
<td>For the systems selection, custom development, and product development project types, transition spans the tasks of installing a system and migrating from the old system to the new system. For the training, professional services and, support/help desk project types, transition involves delivering to the NPO the actual solution resulting from the testing activity.</td>
</tr>
<tr>
<td>Assessment</td>
<td>Assessment spans the tasks of performance, usability, efficiency, effectiveness, and value/impact assessment of a system (i.e., the result of a system selection, custom project, or product development project type). For training, professional services engagement, or support/help desk projects, assessment involves understanding the efficiency, effectiveness, and value of the services delivered by the program team.</td>
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</table>

Several years. Some of the specific projects listed in Table 1.4 are further described in the Appendix A of this chapter. In addition, Table 1.5 is populated with several projects that are furthered described in chapters of the book. Brief names of the projects appear in the table along with a reference to the project (either Appendix A of this chapter or the chapter number in the book where a further description of the project can be found).

Several entries in Table 1.5 are now described in detail:

- The first entry in the table [MS-Office Training for Area NPOs (described in Appendix A)] was a project done in a business information
### Table 1.3. Project Mode

<table>
<thead>
<tr>
<th>Mode</th>
<th>Submode</th>
<th>Other attributes</th>
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</thead>
<tbody>
<tr>
<td><strong>Co-curricular.</strong></td>
<td>University-based. This mode of co-curricular community service project is completed in the context of some university-based organization.</td>
<td>This might include campus organizations such as Engineers without Borders [7].</td>
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<tr>
<td></td>
<td>Non-university-based. This mode co-curricular community service of project is completed outside the context of a university-based organization.</td>
<td>This might include a student-organized project with an area church performing a community-service project on their own without any university affiliation.</td>
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<tr>
<td><strong>Curricular.</strong></td>
<td>Common project course. This involves the use of a common project course within which service-learning projects are completed. The course might be named “CIS Service-Learning Projects Course.” Projects in a common project course could involve many sub-disciplines (i.e., databases, Web design, e-commerce, mobile development, etc.) within the computer and information sciences.</td>
<td>In some cases, project courses may be taken more than once by a given student. In such cases, the student (typically) plays a different role each time they take the course. For instance, the first time a student takes the course, they may play the role of documentation specialist. The second time they take the course they may play the role of software developer. The third time they take the course they may play the role of project manager.</td>
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<td>Sub-discipline-specific project course. This involves the use of a sub-discipline course within which service-learning projects are completed in that sub-discipline. Example sub-discipline courses include database development project course, Web development project course, mobile development project course, and so on.</td>
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<td>Inter-disciplinary course. This involves the use of multiple courses (typically offered at the same time) to complete a project. These courses might both be from the computer and information sciences disciplines (i.e., a Web design project course and database development course cooperatively developing a Web database application). Alternatively, one of these courses might come from the computer and information sciences disciplines and the other course might come from another discipline such as technical writing.</td>
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systems course as a student group project. The project involved analyzing the MS Office training needs of area NPOs and developing a course to meet these needs. In turn, the course was offered and an assessment of learning outcomes for the course participants was also done. Thus, this project appears in the “training” project type with an activity range of “analysis to assessment.” The project entry in the table is shaded in the pattern to reflect that the project was done in the context of a curricular course.

- A second entry in the table is the BOOTUP (Chapter 17) project. This project was done as a cocurricular project as part of the Engineers without Borders cocurricular group at UCLA. This project involves the creation of a custom development project in the form of a Web portal application and process to facilitate the collection, repurposing, and distribution of computers to those in need. The activity range ran the full spectrum from research to assessment. The project entry in the table is shaded in the pattern to reflect that the project was done in the context of a cocurricular group (Engineers without Borders).

- A third entry in the table illustrates a hybrid project. It is the Donor/Member Management System for MC Collaboratory (Appendix A) table entry. This project was originally conceived as a class project in an analysis and design project course. The results of the project from the course were then transitioned to a cocurricular group that did the final installation and ongoing maintenance of the system. The activity range ran the full spectrum from research to assessment. The project entry in the table is shaded in the pattern to reflect that the project was done in the context of both a course and a cocurricular group (Collaboratory).
# Table 1.4. SL in CIS framework

<table>
<thead>
<tr>
<th>Activity Range</th>
<th>Project Type</th>
<th>Research</th>
<th>Analysis</th>
<th>Design</th>
<th>Implementation</th>
<th>Test</th>
<th>Transition</th>
<th>Assessment</th>
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<td>Training</td>
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<td>System selection</td>
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<td>Custom development</td>
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<td>Products</td>
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- Project conducted by curricular group
- Project conducted by cocurricular group
- Project conducted by hybrid group
<table>
<thead>
<tr>
<th>Project type</th>
<th>Research</th>
<th>Analysis</th>
<th>Design</th>
<th>Implementation</th>
<th>Test</th>
<th>Transition</th>
<th>Assessment</th>
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<td>Training</td>
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<td>MS Office Training for Area NPOs (Appendix A)</td>
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<td>Professional services</td>
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<td>Install LAN for CAPC (Appendix A)</td>
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<td>System selection</td>
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<td>Research</td>
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<td>Research/Select MIS for CAPC (Appendix A)</td>
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<td>Donor/Member Management System for MC Collaboratory (Appendix A)</td>
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<td>Support</td>
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<td>World Vision LEAP Impact Assessment Application (Appendix A)</td>
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<td>Custom development projects</td>
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<td>CURE Inf Inventory Barcode System (Appendix A)</td>
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<td>Homebase, Homeroom (Chapter 8)</td>
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- = project conducted by curricular group
- = project conducted by cocurricular group
- = project conducted by hybrid group
• A fourth entry in the table are the “Homebase and Homeroom (Chapter 8)” projects. These projects were conceived as open-source applications that could be used by any number of NPOs. Since these projects were designed to be used by multiple NPOs, we classify them as “Products.” The activity range including the full set of activities from research to assessment. Finally, since the projects were completed in the context of a course, the project mode was “curricular.”

1.6 CONCLUSIONS

The computer and information sciences disciplines afford numerous and unique opportunities for students to apply their gifts, skills, and knowledge via service-learning. Although the application of service-learning is emerging within the computer and information sciences disciplines, the framework defined in this chapter serves as a critical tool to encourage faculty to broaden the scope of service-learning within their disciplines. It outlines the types of activities that can be pursued as service-learning, such as training, professional services, systems selection, support/help desk, custom development projects, and product development projects. Furthermore, it outlines the scope of tasks that can be completed: research, analysis, design, implementation, test, transition, and assessment. Finally, it outlines the various project modes that can be used to implement service-learning projects, including cocurricular, curricular, and hybrid modes. It should aid NPOs, faculty, and students by helping them understand the key questions (and answers) they need to be able to choose SL in CIS projects wisely.

ACKNOWLEDGMENTS

The author would like to acknowledge the contributions that many of his current and former CSC 333 and BIS 412 students have made to the ideas in this chapter. The author also wishes to acknowledge the authors of the chapters in this book whose work has improved this framework. The author is grateful to Messiah College and the Collaboratory for Strategic Partnerships and Applied Research for the support they provided for this work. The author is also indebted to his many colleagues at Messiah College who have informed and influenced his understanding of SL in CIS. These colleagues include David Vader, Ray Norman, Chad Frey, and Scott Weaver. The author would like to thank Ian Thomas for his review of earlier drafts of this chapter. Finally, the author wishes to acknowledge Melissa Dobbins for her support and inspiration.
APPENDIX A: CASE STUDY APPLICATIONS OF THE SL IN CIS FRAMEWORK

Table 1.4 serves the dual purpose of depicting the overall service-learning framework and listing sample service-learning projects completed by Messiah College faculty and students. The projects listed in Table 1.4 are briefly described below.

- **MS-Office Training for Area NPOs.** This semiannual event offers the staff of Central Pennsylvania NPOs the opportunity to receive training on Microsoft Office™. This project happens in BIS 230 (Computer Applications) under the direction of a faculty member. Students, however, design and deliver the training, and NPO participants complete a feedback questionnaire at the end of the training.

- **Install LAN for CAPC.** This project involved a student–faculty team performing the professional service of designing, implementing, and testing a local area network (LAN) for the Capital Area Pregnancy Center (CAPC) [13]. The team also transitioned the LAN to CAPC personnel so they could administer the LAN.

- **Research/Select MIS for CAPC.** This project occurred in the 2006 Spring semester of BIS 412 (Systems Analysis and Design Applications), the BIS major capstone course. CAPC had a need for a Web-based distributed scheduling system to replace their manual scheduling method. The students formed a team under the direction of a faculty member and managed the complete life cycle spanning research through to testing and transitioning the application to CAPC staff. After extensive research and evaluation, the team selected the eKyros [14] application, a Web-based pregnancy center management information system (MIS) that included functionality far beyond distributed scheduling (client management, donor management, reporting, etc.). The students also raised $2000 so that CAPC could purchase the software. CAPC is fully operational with eKyros. The project is chronicled at [15]. Students completed reflection chapters that demonstrated the significant impact the project had on them.

- **Donor and Member Management System for Messiah College Collaboratory.** The Messiah College Collaboratory for Strategic Partnerships and Applied Research (see Chapter 4) had a need for a management information system to manage donors, volunteers, and members. This project was done in the 2007 Spring semester of BIS 412. The students formed a team under the direction of a faculty member and managed the complete life cycle spanning research through to testing and transi-
tioning the application to Collaboratory staff. After extensive research and evaluation, the team selected the CiviCRM open-source application [16], a Web-based constituent relationship management system designed specifically for NPOs. Upon completion of the project, student volunteer members of the Collaboratory (a cocurricular group on campus) took the project over.

- World Vision LEAP Impact Assessment Application. World Vision International [17] is the world’s largest Christian relief and humanitarian organization, with over 25,000 employees in over 100 countries. World Vision had a need for a Web-based application for planning, designing, monitoring, and tracking the impact of field ministry activities. World Vision developed a formalized approach to field ministry known as LEAP (Learning through Evaluation with Accountability and Planning). World Vision provided a grant to Messiah College for faculty and students to develop a prototype system to support the LEAP framework. This project has been ongoing since 2005 in CSC 333 (Database Applications) under the direction of a faculty member, where students form teams and research and develop new features of the LEAP system every year. In addition, the World Vision grant provides funding for faculty and work-study student stipends so that work can continue on the project during the summer months. This aspect of the project was sponsored and done under the auspices of the Collaboratory, a cocurricular services group on campus. The funding also provides support for travel to Africa and related computer equipment. A paper that chronicles this project was recently published [18].

- CURE International Inventory Barcode System. CURE International [19] is a Christian organization that provides medical equipment and related services to needy areas of the world. The organization had a database of all of its medical equipment, but lacked the ability to track the equipment as it traveled throughout the world. In the 2004 Spring semester of CSC 333, a four-person student team under the direction of a faculty member, researched, designed, implemented, tested, and transitioned the integration of a barcode tracking system from Symbol Technologies into the CURE International medical equipment database. The project is chronicled at [20].

- Upper Allen Fire Department Purchase Order System. A local volunteer fire department desired a purchase order system to better manage and track purchase orders. In the 2003 Spring semester of CSC 333, a student-led team under the direction of a faculty member developed a Microsoft Access-based purchase order system custom application. This system has been utilized by the Upper Allen, PA Volunteer Fire Department since 2003. The project is chronicled at [21].
• Messiah College Summer Basketball Camp MIS. Messiah College runs a significant summer basketball camp program for several hundred young people. The director of the camp desired a system to manage the complete camp from registration through to team assignment and bank account management. In the 2003 Spring semester of CSC333, a student-led team under the direction of a faculty member developed a Microsoft Access-based basketball camp management system. The system has been in use by the camp since 2003. The project is chronicled at [22].

• Explore Impact Assessment Product. Several nongovernment organizations (NGOs) have expressed interest in a Web-based field ministry impact assessment system similar to the World Vision LEAP system described above. A team of faculty and students are beginning to research and explore how the existing LEAP system could be generalized into a product so that multiple NPOs could use the same software.

REFERENCES


