SERVICE-LEARNING IN COMPUTER AND INFORMATION SCIENCES
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SERVICE-LEARNING IN COMPUTER AND INFORMATION SCIENCES
Practical Applications in Engineering Education

Edited by
Brian A. Nejmeh
This book is warmly dedicated to the two dear women who have taught me most of what I know about a life of service. My mother, Mary Nejmeh, for more than 86 years has lived an entire life of tireless and joyful service to others. Then, for the last 25 years, my remarkable wife, Laurie, has taught me on a daily basis what it means to unconditionally love and serve others as she cares for our children, Emily and Al, for our special needs daughter, Mary, and thankfully, for her needy husband.

With much love,

Brian
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Service-learning (SL) is a pedagogical model that actively integrates community service with learning outcomes in a credit-bearing academic course or cocurricular project. In service-learning, students actively engage in an authentic service activity that meets the actual and real needs of a community served by a community partner. The community partner is typically a nonprofit organization. Such service-learning projects are designed and structured to promote and foster a mutually beneficial relationship. Students then critically reflect, examine, and converse about the service activity from both technical and nontechnical perspectives. As a result, students gain keen insights and a fresh perspective about the course content and its practical application. Service-learning also promotes a commitment for students to become active and socially responsible members of their communities [1].

Since its inception, service-learning in the academy has occurred predominately outside of the computer and information sciences [2]. Adams [3] noted that, “While service-learning is becoming more common in college curriculums, it is still noticeably absent from many computer science programs.” Sanderson [4] also noted back in 2003 that “computer science is not very visible in the service-learning community.” Of the more than 300+ service-learning syllabi listed at the Campus Compact website in 2011 [5], only five entries exist for computer science.

Collectively, we refer to computer science, information systems, computer engineering, software engineering, and so on as the “computer and information sciences disciplines.” The term “SL in CIS” is used throughout this book to refer to “service-learning in the computer and information sciences.” The computer and information sciences disciplines offer significant opportunities for engagement in service-learning. This is due to the fact that many nonprofit organizations (NPOs) lack the expertise, capacity, resources, and time to leverage information technology to improve the overall efficiency, effectiveness, and value of the services they provide.

Students with skills and aptitude in the computer and information sciences disciplines have historically been in high demand and often rank among the most highly paid out of college. An important aspect of SL in CIS is that it exposes students to the opportunities and rewards of using their skills in the context of doing projects for NPOs. Perhaps by being exposed to
such projects, students might more seriously consider career opportunities
with such NPOs as part of their notion of community service upon gradu-
ation.

Curriculum and courses in the computer and information sciences disci-
plines have struggled to remain current and relevant in the academy [6]. Ex-
periential learning, whereby students learn about information technology by
applying it to real-world problems, is an emerging trend whose impact is just
beginning to be understood [7, 8]. Service-learning is about the formaliza-
tion of such experiential learning in the NPO realm.

There is an emerging and keen interest in service-learning in the comput-
er and information sciences, as witnessed by the very recent increase (albeit
still very small) in the number of published papers and sessions about this
topic at computer and information sciences educational conferences. Al-
though the recent activity in service-learning in the computer and informa-
tion sciences disciplines is encouraging, it is still substantially dispropor-
tionate to such projects in other fields. The interest in SL in CIS spans
faculty, students, higher education administrators (i.e., Deans and Depart-
ment Chairs), and NPO leaders.

Despite the significant opportunities that nonprofit organizations repre-
sent for service-learning in the computer and information sciences, relative-
ly little has been written about these opportunities. This book is the first
known book on this subject. The purpose of this book is to introduce faculty
members and administrators, as well as NPO leaders and the communities
they serve, to the opportunities, benefits, and challenges of service-learning
in the computer and information sciences.

The book begins by presenting a service-learning framework (Chapter 1)
that defines various options for integrating service-learning into computer
and information sciences courses and activities. The framework refines ex-
isting pedagogical models to fit the computer and information sciences dis-
ciplines. The following service-learning options are covered in Chapter 1:

- Training: focus on imparting computer and information sciences skills
  needed by the staff of NPOs
- Professional services: focus on providing advice in computer and in-
  formation sciences issues facing NPOs
- Systems selection: focus on defining system needs of an NPO, identi-
  fying and evaluating candidate IT solutions, recommending a solution,
  and transitioning the solution to an NPO
- Support: focus on providing customer support related to IT systems for
  NPOs
- System projects: focus on developing an information system project
  for a specific NPO
• Products: focus on developing a common information system product used by multiple NPOs

The book is an edited collection of papers written by field practitioners actively engaged in service-learning in the computer and information sciences. In interacting with authors during the process of researching this book, it also became clear that there is much student/community engagement and service going on in the computer and information sciences outside the realm of a formal credit-bearing course. For this reason, the scope of the book includes noncredit-bearing student/community service experiences that occur in a cocurricular setting. The chapters in the book offer an in-depth look at the various forms of service-learning projects and structures in the computer and information sciences. The chapters discuss specific projects undertaken, how they were organized, and the challenges related to integrating service-learning into computer and information sciences curricula and cocurricular activities. The chapters place an emphasis on the unique lessons learned in doing service-learning engagements and on recommendations for those interested in conducting or encouraging such engagements. The book contains four main parts:

1. The first part of the book introduces the topic of service-learning in the computer and information sciences. It offers a framework for the various methods of integrating service-learning into computer and information sciences disciplines. The framework refines existing pedagogical models to fit the computer and information sciences disciplines and then illustrates service-learning options in the computer and information sciences. It also defines the range of service-learning activity across the continuum of research to assessment. The framework allows the reader to better understand the context for the various service-learning programs and projects discussed in the book.

2. The second part of the book focuses on organizational and pedagogical models for introducing SL in CIS. Chapters in this part of the book come from global field practitioners. These chapters discuss the organizational and pedagogical models for integrating service-learning into the computer and information sciences. Topics covered in this part of the book include how university initiatives around SL in CIS are organized and managed, curriculum integration concerns, accreditation concerns related to service-learning, capstone projects involving service-learning, and the use of open-source technologies in a service-learning setting.

3. The third part, and main body of the book, is a collection of chapters about service-learning projects in the computer and information sci-
ences written by global field practitioners. These chapters offer an in-depth look at the various forms of service-learning projects in the computer and information sciences.

4. The fourth part of the book focuses on lessons learned based on the experiences of field practitioners. It includes a chapter that synthesizes the lessons learned from the other chapters in the book. This chapter highlights best practices for successful integrating SL in CIS. This part of the book also includes chapters that discuss the impact of service-learning in the computer and information sciences.

For faculty and students in the computer and information sciences, service-learning offers significant benefits. Service-learning in the computer and information sciences directly addresses a chronic problem facing the computer and information sciences academic community—practical application. The technology industry has consistently criticized the academy for not equipping students for the workforce [6]. Furthermore, service-learning models whereby students learn about information technology by solving real-world problems are an emerging trend that is having a positive impact [8]. As such, SL in CIS offers much promise with regard to bringing practical applications to computer and information sciences education.

The book exposes faculty and students to many projects and different models for successfully executing them in both a service-learning class setting and a cocurricular, noncredit-bearing community service setting. It also exposes faculty and students to the nonprofit sector and how technology can be used by this sector to significantly impact the people and communities they serve. This will enable faculty to interact with local and global NPOs in a new way, leading to mutually beneficial project partnerships. Faculty will be introduced to a new teaching pedagogy in the computer and information sciences, enabling them to better understand the range of options for SL in CIS. The book is especially relevant to faculty teaching project-based courses or capstone courses. The book exposes faculty and students to the various ways service-learning can be integrated into the computer and information sciences disciplines. It provides a context within which student–faculty partnerships can occur in projects, learning, and scholarship. In summary, the book expands and enhances SL in CIS opportunities.

The current generation of students is very interested in active learning and in serving. This book will help students, faculty, the academy, and NPOs satisfy these interests. The book will allow students to more appropriately and successfully engage in SL in CIS as they learn from other successful projects.

Finally, many NPOs lack the expertise, resources and time to leverage information technology to improve the overall efficiency, effectiveness, and
value of the services they provide. Service-learning projects can improve the overall efficiency, effectiveness, and value of NPOs. These projects lead to improved marketing, fund-raising, communications, service quality, and increased capacity to better meet the needs of the communities NPOs serve.

The book provides a framework, stimulus, and practical working models for promoting joint projects between the academy and the NPO community. It should serve to encourage NPOs to successfully engage with the academy in mutually beneficial partnerships. By doing so, NPOs will benefit in two direct ways. First, the SL in CIS projects they participate in will allow them to be better users of technology, leading to improved marketing, fund-raising, communication, and service quality, and increased capacity to serve their communities. Secondly, SL in CIS projects offer the possibility of increasing the technical workforce for these organizations as students are exposed to the opportunities and challenges NPOs face and may sense a calling to work in an NPO environment upon graduation.

Brian A. Nejmeh
February, 2012

REFERENCES

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