Is There Service in Computing Service Learning?

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ABSTRACT
A variety of researchers have advocated for service learning projects in post-secondary computing programs. While these projects can achieve important disciplinary outcomes for the students, what has been under examined is the benefit that these projects have for the service recipients and their community. This paper argues that since service learning projects are meant to benefit both student donors and community recipients, we must examine much more carefully how computing service projects interact with all the social actors affected by the projects. Taking such an approach will require recognizing that ICT by itself will not improve or increase democracy, equality, social inclusion, or any other social good. Analogous to the experience of foreign aid recipients in the developing world, some service learning projects may actually do more harm than good. The paper concludes by providing some sample computer learning projects that are oriented more strongly towards achieving true service for the recipients.

Categories and Subject Descriptors
K.3.2 [Computers and Education]: Computer & Information Science Education – computer science education.

General Terms
Design, Experimentation.

Keywords
CS Education, Service Learning, Social Issues, Pedagogy.

1. INTRODUCTION
“Good intentions may do as much harm as malevolence if they lack understanding.” – Camus [9]

One of the most heartening developments in the educational pedagogy of the 1990s was the (re)discovery of service learning. Seen by its advocates as a way to reengage the young with civic values ostensibly lost [22, 33], service learning is a “teaching and learning strategy that integrates meaningful community service with instruction and reflection to enrich the learning experience, teach civic responsibility, and strengthen communities” [34]. Service learning is very much rooted in American intellectual history, with many of its early advocates harkening back to a long tradition of youth service in the United States [32], as well as a wide variety of service-oriented government legislation, such as the Depression-era Civilian Conservation Corps, to the 1964 Volunteers in Service to America, to the more recent National Community Service Act and the President’s Council on Service and Civic Participation. Indeed one could even stretch the American emphasis on youth volunteerism back to the Calvinist roots of America’s initial theological covenant [30].

Perhaps due to this historical resonance, service learning has been widely and enthusiastically adopted in the United States. More than half of all high schools and over 900 higher education institutions in the United States use service learning in their curriculum [7]. In the past decade, a wide variety of service-learning experiments in computing education have been reported. In the context of computing education, service learning has been praised in particular for providing an ideal active-learning environment that gives students practical experience with real-world clients. Christensen et al have provided a concise statement of the perceived benefits of service learning for computing students: that students are able to “experience a real IT environment,” that they are “able to add this experience to their resumes,” and that they can “feel good about … [their] contribution” [10].

But what is often under-argued is the benefit to the community in computing service learning. It is typically assumed in published accounts on computing service learning that by providing free labor for a non-profit organization, service learning projects are by definition of benefit to the recipients. The rest of this paper will provide some critiques of this stance and will argue that, analogous to the experience encountered by foreign aid recipients in the developing world, some service-learning projects may, despite the best of intentions, actually be harmful for the recipients and/or their surrounding community. The paper will also describe some alternative sample service-learning projects in an endeavor to re-inject some of the original social justice perspectives that were at the heart of the initial service-learning movement [27, 31, 38]. In other words, this paper attempts to

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1 Of course, nothing in the definition of service learning would prevent its adoption in other countries and cultures (see, for instance, [2]). Nonetheless, the vast majority of the service learning literature is from authors teaching within the United States.
move the attention of computing service learning away from its benefits for our students and toward the different ways we can make service learning more beneficial to the wider community. That is, following Valentine’s computing education taxonomy, the intent of this paper is to “generate debate on an issue … among the broader [computer science educators] community” [46].

2. CATEGORIZING COMPUTING SERVICE LEARNING

Like almost any widely-adopted educational approach, a wide variety of practices are grouped under the service-learning umbrella. Furco [15] has described a continuum to capture the many different flavors of educational experiential service programs (See Figure 1).

![Figure 1. Service Learning Continuum](image)

These three service programs differ in their principle beneficiary, their focus, and their explicit educational purpose (see Table 1). Community service, according to this categorization, is primarily focused on the service and the benefits being provided to the recipients; students receive some indirect benefits such as awareness of others in their community and the satisfaction that comes from helping others. With service-based internships, by contrast, the focus is on student learning outcomes and thus the students are the primary beneficiary of the service activity. True service learning, according to Furco’s continuum, is the attempt to balance the approaches of the other two so that both the community recipient and the student provider receive roughly equal benefits [14].

<table>
<thead>
<tr>
<th>Primary Beneficiary</th>
<th>Community Service</th>
<th>Service Learning</th>
<th>Service-Based Internship</th>
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<tbody>
<tr>
<td>Recipient</td>
<td>Recipient and Provider</td>
<td>Provider</td>
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<td>Service</td>
<td>Service and Learning</td>
<td>Learning</td>
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<td>Social justice and civic development</td>
<td>Civic and academic development</td>
<td>Career and academic development</td>
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Table 1 – Service Perspectives

So where do most reported computing service learning programs fall in this continuum? It is this paper’s contention that there is a definite tendency toward adopting the internship approach. This claim is perhaps debatable in the sense that what is internship to this author may be understood as true service learning by the original authors. Nonetheless, some computing service learning programs can uncontrovertibly be categorized as lying on the internship side of the continuum. For instance Tan and Phillips [43] report a service-learning project in which students created a variety of software systems for corporate clients. It hopefully is not uncharitable to say that this type of service-learning is really not that different from traditional forms of experiential learning such as co-ops, work-terms, and real-world capstone projects. While there is nothing wrong with such a student-driven purpose, one of the key hopes motivating the adoption of service-learning is that the student will gain some type of civic-mindedness through his or her service learning experience [6, 20, 33, 35]. Using the terminology of sociology and political science, many advocates of service learning have argued that it will increase the social capital of the participating students as well as broaden participation with, and deepen the commitment to, the surrounding civil society. This civic orientation is one of the key stated differences between internships and service learning.

Rather than providing services to businesses, most computing service-learning programs examined for this paper do attempt to satisfy the civic goals of service learning by selecting recipients within the non-profit sector. Some authors seem to provide mainly a functional justification for utilizing this sector; that is, they advocate non-profit recipients not for justice or civic reasons but because they are smaller organizations whose needs fit a single semester better and because there is a large supply of non-profit organizations that require computing help [24, 41, 45]. Other authors, however, do advocate for non-profit service recipients because this aligns the project with the community orientation of the larger service learning pedagogy. Reported non-profit recipients in the computing service learning literature include schools or other education organizations [10, 12, 17, 25], governments [44], charitable organizations [2, 5, 37, 39, 40, 41, 49], and the developing world [4]. Typical reported service projects are websites [2, 4, 17, 39, 44], databases [40, 41, 43, 44, 49] and hardware or software support [4, 10, 37, 42].

Where, then, do these types of free computer consulting projects for non-profit organizations fall on the service continuum? Certainly the authors of these studies observe that these projects provide the student with helpful computing and non-computing learning outcomes, such as experience working with real-world clients, exposure to workplace ethical issues, better understanding of the different aspects of the computing curriculum, practical experience in a team environment, improving communication skills, putting practical experience on their resumes, as well as the “‘feel good’ aspect” [39] of the work. Most of these purported outcomes are simply deduced from the nature of the work. A few authors have attempted to measure them by asking the students whether these skills have improved [2, 12, 17, 25, 40] or by asking the student to write a personal reflection on their experience [4, 21, 44, 49]. But since all of the above cited learning outcomes (except perhaps the “feel good” aspects) can also be achieved by traditional experiential internship programs, where then is the service in these types of projects?

3. FINDING THE SERVICE IN COMPUTING SERVICE LEARNING

As previously mentioned, service learning is distinguished from traditional experiential internship programs by a roughly equal focus on the service recipient and the student provider. The existing computer service learning literature appears to have a very strong emphasis on the perceived student benefits. The computing service learning literature is not alone in this regard. Abes, Jackson, and James [1] found in their review of the wider service learning literature that the main motivation for teachers and faculty in adopting service learning is the perception that it improves student learning. Maybach [28] observed that “in reality, the current paradigm of service learning is focused almost
exclusively on the growth of the individual student providers” and that the “effects of the service provided, however, are very rarely researched.” Butin [6] in his evaluation of K-16 service programs more strongly claims that “there is considerably less evidence that service learning has provided much benefit for the recipients.”

How does the literature on computing service learning perceive its community benefits? Almost without exception, all the computing papers examined for this study assume (directly or indirectly) that by providing free computer consulting work for non-profit organizations, they are, by definition providing a valuable community service. This is perhaps a natural assumption. We computing professionals and professors often make the assumption that ICT is ultimately a social good and hence providing free ICT consulting is by definition a social good as well. This assumption lies at the heart of the computing service learning literature. It substantially ignores the complexities involved in the interrelationship between computing technology and the social world in which it is embedded [11]. In the messy real world, what might seem beneficial to a profit or non-profit organization might not be beneficial to all its employees or its clients. What might, for instance, seem beneficial to an organization at time 0 might not be so at time N after on-going support costs are factored into the cost-benefit equation.

Providing web sites for an organization (such as a school) might have complex unexpected consequences that are not unambiguously good. Brooks [4], for instance, notes that his computing service learning project may benefit the university, there was no evaluation of the potential ethical issues of increasing the university’s monitoring and tracking abilities. Finally, providing free ICT work might benefit an organization but hurt the wider community. For instance, by providing free used computers in a less developed geographic area [4, 42], the end result may actually undermine local expertise by depressing local price conditions and thereby make it difficult for local startups to economically compete against the free options. Interestingly, this is a frequently observed effect of certain types of foreign aid [36].

The comparison between foreign aid and computer service learning is a relevant one. In the 1950s and 1960s, so-called modernization theory was the dominant paradigm in international economics, comparative political science, as well as across a variety of international organizations such as the United Nations and the World Bank. Following the success of the US Marshall Plan in rebuilding the war-shattered economies of Western Europe, the modernization project supporters believed that countries in the less developed world could “catch up” to those in the developed world through the infusion of capital, modern technology, and western expertise [29]. Unfortunately modernization theory ended up being a failed project, both academically and in terms of real-world outcomes. Twenty years of development projects did not result in any significant relative “catch up” with developed countries in standards of living or in economic growth; indeed by some measures the gap between the developed and non-developed world widened during that time. In the academic arena, modernization theory has largely been discredited and replaced by alternative theoretic approaches to development, such as dependency theory, neo-liberalism, and neo-institutionalism [26]. All of these alternate approaches to development highlight how the typical modernization approaches (especially technology infusions) of the 1950s and 1960s tended to reinforce existing power relations and thereby had little impact on improving the relative imbalance between the developed and non-developed world nor did they ameliorate the conditions for the poor within the countries subjected to “modernization.”

A very similar problem can be seen in many well-intentioned but unsuccessful attempts to address the so-called “digital divide.” In these updated versions of modernization, communities or people lacking ICT were provided with it in the hope that it would be the catalyst to improving their standard of living by providing them with a tool for self-betterment. Naïve efforts that do not significantly involve the recipients or take their social context into account have largely been unsuccessful in architecting transformations because, as Warschauer [48] noted, “ICT does not exist as an external variable to be injected from the outside to bring about certain results.”

In other words, both the modernization project and many digital divide projects failed because they were predicated on a key
faulty sociological assumption, one that is also evidently shared by the computing service learning literature. Modernization and digital divide advocates were committed to a type of technological determinism, in that they believed that technology is the primary agent of social change [18]. As computer professionals, we perhaps naturally assume that technology in general, and computing in particular, has a transformative effect on individuals, organizations, and society. The computing service literature contains a similar latent teleology that technologies are autonomous change agents, “that such agents can affect positive and sustained transformations, that such transformations are promoted by the more powerful for the less powerful … and that all individuals involved in such a transaction benefit from it” [6]. This is an assumption about social agency that is in general not shared by historians, sociologists, and other specialists in the Science, Technology, and Society (STS) research field [11].

It is this paper’s contention that when we blithely assume that providing free computer help to non-profit organizations is by definition a social and community good, we are making an analogous error to the modernization planners of the 1950s and 1960s or many digital divide efforts of the late 1990s. When one assumes that providing ICT consulting, installing hardware, or setting up websites or databases will inevitably help the recipients and the wider community, it is often because one is also committed to the belief that ICT technology is transformative and (almost) always beneficial. If we are interested in truly providing services that benefit the recipients, the first step towards that goal should be the jettisoning of this belief and replacing it with a more sophisticated and contemporary social theory, one that recognizes that technologies exist within an institutional and social context and it is this context that determines how or if new technologies alter power relationships and social structures. Thus, the method for creating true computing service projects is not to inject ICT into non-profit organizations, but instead to carefully study the social structures and the relationships within and between the organization and its surrounding social actors beforehand. That is, we need to see how ICT might be used to make the organization, its employees, and its community more equitable, just, and socially inclusive [48]. This will require that those setting up computer service learning projects focus quite a bit less on student disciplinary learning outcomes and quite a bit more on achieving true service for the recipient social actors involved in the service project. The next section will provide some practical suggestions to help in this regard.

4. ADDING TRUE SERVICE

As Buton has noted [6], “service learning is both potentially transformative and repressive.” It is this paper’s contention that many of the reported service learning projects may perhaps unwittingly not always be beneficial for either the service recipient or the broader community. As well, by focusing almost exclusively on disciplinary student outcomes, these computing service learning projects have not realized the potential transformative effect of service learning. Robinson [38] notes that service learning programs that are limited to short-term work in non-profit organizations provides “poor training for critical citizenship, political reasoning, or social transformation.” Niemi et al [35], in their evaluation of the political and participatory impact of high school service learning, found that the hoped-for long-term civic mindedness outcome was only achieved when service learning was prefaced with political and social contextualization and when the service work was explicitly tied to political or social justice goals. When such explicit social and political instruction is absent, service learning becomes “a kind of voluntary bandaidding of social problems that not only ignores the causes of social problems but lets off the hook those responsible for the problem” [20]. Various service learning researchers have argued that successful service learning projects need to move beyond service learning as charity and instead embrace service learning as justice [27, 38].

Such an advocacy orientation might, at first glance, seem too political for a computer science course. Yet Goldweber et al [16] have argued that computing students are very much motivated by a desire to benefit society and that explicitly embracing that desire may in reality be a key way to increase enrollments in computing disciplines. Just because we are “only” computing professionals, it doesn’t mean that such an explicit social justice approach cannot be added to our service learning projects. Twenty years ago teaching ethics was considered the exclusive purview of philosophy departments, and yet today almost 90% of computer science programs include computing ethics instruction and that instruction is almost always provided by computer science faculty [16]. Simply by prefacing computing service learning projects with instruction in the complexities between technology and society and by showing how computing can improve or distort power relations between individuals, groups, and institutions, there is a chance that our students will gain more than just disciplinary computing outcomes from their service learning experience.

Similarly, if we are going to make use of service learning projects, we, as teachers, need to pay closer attention to the social and political outcomes of such projects and perhaps only approve of ones that are oriented more explicitly to maximizing social justice for a wider range of community actors. Perhaps one important way that this can be accomplished is by reversing or integrating the recipient and provider roles, an approach that has been used successfully in some innovative service programs [28]. Rather than treat non-profit organizations as clients for computing consulting, why not, for instance, have homeless individuals teach our students about the difficulties of finding vital government and charitable services in the new internet- and mobile-only environment when one doesn’t own a cell phone or a computer. The students could then work with the homeless to show them how to find free internet-enabled computing and how to use web search for locating those services. Alternately, the students could set up those services via an informational kiosk in a homeless shelter; the students would also work together with the shelter’s clients so that they could themselves operate the kiosk in the future. In this type of so-called border-crossing [19] service-learning project, the student is simultaneously learning from as well as empowering the recipient.

Another type of justice-oriented service project might be one in which the student works with people who have become unemployed due to ICT-enabled outsourcing. Again, the recipient can teach the student about the social reality of ICT advances, while the student can help the recipient by, for instance, together setting up an online resume/portfolio and making use of online job boards. Another example of a border-crossing service project would be one in which students collaborate with employees...
working within environments in which the employees are being electronically monitored. Once again, students could learn from the recipients about the potentially disciplinary nature of ICT advances [3] and then help the recipients in setting up encryption systems on their personal computer devices or how to make use of free online services that are less vulnerable to employee monitoring. This last example is of course potentially quite controversial since employers have legal, and often legitimate reasons for electronically monitoring their employees; nonetheless, working with such a luminal case may provide the most important lessons in the civic implications of real-world computing.

Setting up these types of computer service learning projects would be significantly more challenging than the usual ICT projects for non-profit organizations. As Mitchell [31] notes, involving students in social change projects is more difficult than traditional internship-style approaches and that professors “may need to work outside traditional non-profits and community-based organizations to partner with groups actively working to change systems and structures.” For instance, there are agencies that do work with the homeless and the unemployed; similarly, unions and other employee organizations could facilitate these types of projects.

5. CONCLUSION
It is this paper’s contention that computing service learning has been too preoccupied with the students' attainment of disciplinary outcomes. One of the consequences of this preoccupation has been a lack of critical awareness of the effect that computing projects have on their recipients. By re-orienting computing service learning towards the community recipients in a social-justice manner, our students can actually make a positive difference to their community as well as transform their understanding of the social implications of computing. As Maybach has noted [28], without “an accountability for or an understanding of the needs of the individuals in the urban community, the effects of service-learning projects may indeed be viewed as malevolent by the very individuals whose lives the service was intended to enhance, despite the best of intentions.”

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7. REFERENCES


