# Challenges and Opportunities in International Service Learning

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## Abstract

Service learning, and specifically the work of organizations such as Engineers Without Borders USA, have become popular with universities looking to provide their students with applied educational opportunities which blend technical skills with a broader social mission and help the institution demonstrate its global impact. However, questions remain regarding the truly realized outcomes for students, as well as the unintended consequences that may be experienced by the partnering communities. This paper describes early results results from a four-year, mixed-method study which collected data through a combination of interviews and focus groups with members of the Engineers Without Borders USA organization, analysis and coding of completed project documentation, and observations and notes collected during a field visit to a project site. We conclude from our early data that students who are able (given sufficient resources) to fully participate in these type of projects do see positive benefits. However, barriers may prevent all students from having this opportunity. Further, the nature of student service learning projects inherently creates challenges for the communities that partner on these projects. Ongoing revisions to the Engineers Without Borders USA operating procedures may remedy some of the deficiencies, while researchers, participants, and institutions should continue to critically evaluate the impacts and outcomes of their work.


## Introduction

Drawing on research from a four-year, National Science Foundation-funded project, this paper explores specific opportunities for and challenges of incorporating Engineers Without Borders USA (EWB) projects into the undergraduate engineering experience. A recent National Academy of Engineering report identified challenges with incorporating ethics into undergraduate engineering education and noted the relatively persistent feeling that technical and non-technical skills are separate, with the technical skills being more highly valued [1]. Participation in EWB projects, with their explicit social justice mission, has already been shown to have a positive effect on students, attitudes towards community service, and career expectations [2–7]. Other work has documented the effects of service learning participation on meeting ABET learning outcomes [6] and providing global engineering competencies [8, 9]. While the benefits of service learning for student education are enticing, there is also some evidence that participation in projects with local communities, in contrast to internationally-based field work, can achieve the same student outcomes in terms of technical and professional skills [10, 11].

Integration of service learning into the curriculum also necessitates the consideration of impacts on the communities in which the projects take place. Research has shown that the integration of service learning can have unintended consequences for partnering communities [12–14]. Through interviews with community representatives, Blouin and Perry [15] identified that the combination of poor student conduct, mismatched objectives, and inconsistent communication can lead to undesirable outcomes for community participants. Some researchers in this field have offered suggestions for improving both institutional and community outcomes that include closer partnerships with community organizations even to the point of collaborative construction of the curriculum which includes service learning and a strong institutional commitment to community engagement and trust building [15, 16]. Taking it further, Mitchell et al. [17] offer strategies for "challenging the pedagogy of whiteness in service learning" by being intentional through examination of our assumptions about our students, the communities, and the objectives of the activity. Similarly, framing the conversation about the service learning opportunity to focus not only on helping the community meet their needs, but also on what skills and resources the community brings to the table, helps to see the community as empowered on its own, and as an active contributor to the project, not simply a passive recipient. Finally, Mitchell et al. [17] propose the use of active, instructor-led discussions around race and racism and the role it plays in interactions between and among the faculty, students, and the community. Actively leading a discussion on race issues can help reduce the nonconstructive dialog that is likely to occur between students on the periphery.

In this paper we expand on this work, using interview data and selected case studies from EWB projects conducted by student chapters to draw out the positive benefits for students in thinking about social justice and ethics in relation to their community-based service learning. We will also share preliminary results from an analysis of EWB documents and participant observation with one EWB chapter to explore the impacts this work has on communities.

## Methods

This project uses a mixed-methods approach to study an array of issues involved with service learning; as noted, this paper reports on student and community impacts. We will briefly describe three of our data sources being used to inform our overall project considerations; for a full discussion of project questions and methods, see Berg et al. [18].

### Interviews and Focus Groups with EWB Participants

Our research team has conducted interviews or focus groups with a total of 42 students, 12 faculty, and 12 professional volunteers or mentors involved in EWB. We have also conducted interviews with faculty who have done other types of service learning projects, but we are not reporting on this data here. Most participants were recruited from EWB and ASEE Conference attendees. Email invitations were sent to all attendees at EWB events; for the ASEE conference, specific divisions were asked to send a request through their email lists. The only exceptions to this process were interviews conducted with the chapter we traveled with (see below). Interview questions covered a range of issues including how the participant came to be involved in EWB, what their participation has included, what they have learned or gained from their participation, if

their participation has impacted their engineering identity or career path, how they were able to fit their work into their lives, and how they think about the ethics of doing their work. Interviews were conducted during these conferences, during travel, and, in one case, via phone. Due to time constraints during conferences, some focus groups were conducted. At other times one-on-one interviews were possible. All interviews were recorded and transcribed, with data coding underway through Nvivo.

**Analysis and Coding of Project Documents**

EWB-USA shared all project documents they have collected with our team (over 6000 documents representing approximately 500-600 projects). University of Wisconsin-Stout student research assistants cataloged these files–noting the type of chapter (professional or student) and the chapter's location, the type of project, the documents that existed, and the dates the documents covered. From there, we carefully chose thirty projects to reflect a variety of project types, EWB chapters, and geographic areas. We chose a mixture of water, sanitation, and other infrastructure projects in rough proportion to these types of projects overall. Projects in different geographic areas were also chosen, again, in roughly the same proportions as the areas in which EWB projects are conducted. Finally, we chose a mix of institutions–large public universities, elite private colleges, and smaller institutions. Our choices within these parameters were random (that is, we did not look into the details of the projects and pick particularly successful or unsuccessful projects). In at least two cases, a project was chosen because we also had interview data collected from members. As noted above, those members volunteered to talk to our team.

EWB documents contain a wealth of information about how projects proceed, the roadblocks that are encountered, and the results of EWB work. It is important to note that, since the information about how projects impact communities is filtered through EWB members, the accounts have a tendency to portray work in a favorable light. Even given this tendency, however, project roadblocks and failures are documented, sometimes very honestly. In addition, these documents most often focus on the technical aspects of the project (did the water system work, are latrines functioning, etc.) or on more easily measurable outcomes (lack of E. coli in the water supply, survey data about how often people report using the system that was built or the technology that was provided). In an effort to get a more comprehensive look at outcomes, our research added an ethnographic component.

**Field visit with EWB Project Team**

Originally, the ethnographic component of our project was envisioned as following our local chapter through an entire project cycle. We planned to travel with the EWB team, sit in on community conversations, and conduct participation observation in chapter meetings, work, and planning sessions. The chapter identified for this portion has, for a variety of reasons, not been able to make progress on their project, but we were able to find another chapter to travel with. However, we have not been able to conduct participant observation during ongoing chapter activities due to geographical distance. Instead, ongoing "check-ins" with chapter leadership have been conducted. In January of 2017, Dr. Tina Lee and a student research assistant were able to travel with the chapter (described in more detail below) to a county in Latin America. On this trip, we observed all activities undertaken by the team (splitting up to make sure as much as possible was covered), interviewed all members of the team, and assisted with project tasks including

translation, the construction and administering of a house-to-house survey and a physical survey to collect assessment data for the team's next projects (a river restoration/wash station project, a foot bridge project, and a potential water distribution system in a neighboring town), and even performed manual labor (moving rocks for the foundation of the sedimentation tank, and helping to grade a road to move construction equipment). In addition, we had informal conversations about the work that was occurring and how the chapter is run. Extensive fieldnotes were taken to record these experiences and interactions.

## Results

### Impacts on Students

EWB membership typically begins in universities, and students are often drawn to the service learning opportunity through activity fairs, club showcases, or similar campus-wide, extra-curricular events. As an organization reliant on its volunteers, a major goal is to impact students in such ways that they continue on as either faculty or professional members. For reasons we will explore elsewhere, cultivating and sustaining faculty and professional members is particularly challenging, given the realities of tenure and promotion expectations in the academic setting as well as time constraints and competing priorities in industry settings.

Student members cite a variety of reasons for their initial interest in EWB, with some indicating they specifically sought out a university that had an EWB chapter. From the 42 student interviews, three major themes emerged around EWB participation: A commitment to "socially engaged engineering," where their technical skills could contribute to the betterment of society; second, the opportunity to employ classroom learning in real-world applications; and third, an alignment with their future goals in using an engineering degree, for example, in relation to international development or public health. In many ways, students sought out EWB as it already aligned with their values, and provided a means to make a difference.

Student participants shared consistent optimism about their roles in EWB. We heard many examples, similar to: "I wanted to give water to people, I wanted to be able to give roads to people, I wanted to be able to do all of this while conserving... minimizing costs, things like that." "I've always wanted to find a way to make a difference in the world, and that's a huge part of ... University in general. And so being able to do it with EWB and using my engineering knowledge to make a difference, just really involved, is something else." "I think it's hard to find a career where you feel like you're making as big of an impact every single day that you can with EWB." "It's translated into... I feel like I'm a better person. Even, I feel like I'm a more rounded engineer but just maybe better as a person." Such statements reflect the ways in which EWB aligns with one's personal ethics and values while developing one's professional identity. Overall, our participants acknowledged that EWB participation positively influenced their awareness of their roles in social justice.

To further understand the role of social justice in EWB work, we inquired how student participation in EWB projects impacted their understanding of other cultures and professional ethics. We heard of many "surprises" related to cultural difference that students experienced while traveling for their EWB projects; for example, "On the first trips we've kind of found that

(CITY NAME) works its own way. As time has gone by we have figured out that (CITY NAME) works its own way, and not necessarily the things I would expect to happen..." Or, "I was not expecting this to be such an experience; I thought it was gonna be easier because we speak the same language, but I just find that cultural background makes a lot of difference even if you speak the same language." Another shared with us that he had never been to a developing country:

> I never really necessarily saw myself doing something like that, and I knew I wanted to be an engineer but I didn't know what I want to do with this. I had no concept that it could be applied in service to other people like that, and so EWB, I started off as a freshman and it fundamentally changed my perspective on the world, on what engineering as a profession can do, the impact it can have and it provided a conduit for me to learn all these things and to actually travel and see different cultures and learn to be more culturally sensitive.

Similarly, one participant offered that through EWB travel, she became aware of

> so much experience you take for granted in America that you don't realize that just going over seas and living not in hotels but in tents and in town with the local people; kind of like just being appreciative of what you have here and cross cultural experiences that itself is valuable...

Three students who have since graduated (two are currently in graduate programs while the other is working professionally) reflected on their interests in social justice and working with people, not just technical processes, noting

> it's all about the culture...and understanding that globally how people are really similar, it just makes me understand that, kind of all these differences politically and religiously, it doesn't really matter as much as the media makes it seem. So I hope that makes me a more informed citizen.

In regard to professional ethics, students expressed an array of perspectives, but overwhelmingly, the importance of applied ethics was acknowledged. Specific coursework in ethics was not lauded as significantly important in preparing for humanitarian service learning. Further, students did not respond with traditional "philosophical" answers (that is, they did not use terminology such as "utilitarian" or "deontological"[1]) when probed about the ethical frameworks they employ, though many of the discussions about their community experiences reveal a deontological slant. Instead, and as mentioned above, there is a feeling that individuals come to EWB with a strong sense of ethics (some indicate it is their faith) and are seeking ways to put their "ethics into action:" "Most people who come into EWB do it for an ethical reason because they want to help people and when we get deeper into that its very interesting to see how we deepen our understanding of what ethics looks like in action." And, professional ethics is a standard, a level of integrity:

> it was ingrained in us that ethics... to be, to own your signature. That what you put your name on... You're putting your name on it, you need to own it. Putting in on paper, this is your work, these are your calculations, you're signing it so you need to take responsibility for it.

[1] the ethical position that judges the morality of an action based on rules

Across our interviews, professional ethics is framed in language such as "it's not always can we, but it's should we?" This interest in the normative aspects of EWB work is consistent with other humanitarian initiatives, such as Doctors Without Borders.

While this section has focused primarily on the positive aspects of students' experiences in EWB, we will also note that students gave very honest portrayals of challenges they faced while "in-country," or on projects. As expected, many of the challenges had to do with communications. While language barriers may exist, more concerns were voiced around misunderstandings of the roles and responsibilities of the various participants. Often, an NGO will be involved in-country, and while these can provide a point of contact and continuity, information is not always shared across the community and the EWB chapter. In addition, students reported challenges around expectations. In fact, in addition to the cases below, another case in our study reveals how projects can fail due to the expectations of the community (a working water system in a relatively short amount of time) as opposed to the realities chapters can face around fundraising, processing the requisite paperwork with EWB-USA (the central office), and limitations of student availability and skills.

Students described such challenges as lack of appropriate tools and equipment,

> We can't do typical barrier wall designs like in the U.S. and so our mentor was just throwing out all these ideas left and right and we're like 'that's not gonna work, man. You can't do that there.' We don't have any construction equipment. We're lucky if we have a concrete mixer. So just the newness to the way things work in-country can be kind of a challenge if you haven't been there before, if you haven't been part of a construction process.

Other challenges involve differing ideas around cultural concepts, such as ownership or access. For example, one participant shared an experience that speaks to the challenges in communication and cultural understanding:

> The community accesses this well that is off-site, and within the time we started working the project that parcel of land that the well, that they accessed the water from, had changed hands several times and the community had no idea. We actually had to talk to the adjacent parcel owner and they said "So and so owns it," "no, no, no, it's this guy that owns it." "No, they bought that like a month ago." And we were like "Well, we had no idea."

The respondent in this case reported that he truly learned the important of communication, and it made him a better professional in the long run.

Given these sorts of benefits as well as challenges for students, our project also seeks to understand how humanitarian service learning might impact the communities in which EWB chapters are working. It is notable that a common consideration permeated our interviews with students, faculty advisors, and professional EWB members, around the "priorities" of EWB. That is, is it an organization that "is all about the students?" as some expressed, or is it about the communities? Ideally, it is both, but at the midpoint of this project, EWB changed its processes in ways that many student members, and professional members, did not support. Called "EWB

2.0[2]," in short, this change created tiers, and would eventually close EWB projects in specific countries. EWB members who have projects in those to-be-discontinued countries shared significant, and well-understood, concerns. At the same time, this change moves some EWB operations to in-country offices in an attempt to localize organizational expertise. We will comment more on the process change below and in subsequent publications.

**Impacts on Communities**

In this section, we draw on our preliminary analysis of documents and our ethnographic data. Interview data will also be incorporated to round out our account. As noted above, we have been struck by how open students are to share the shortcomings of their projects in interviews. This information is also therefore helpful in getting a more honest account of community impacts.

Overall, our data suggests that communities are positively impacted by EWB work when projects are successfully completed in the EWB ideal time line. When projects are unsuccessful, on the other hand, communities are not generally negatively impacted, although there are some cases in which EWB projects are caught up in community disputes and political splits. In these cases, it is very possible that EWB presence might exacerbate these conflicts, a negative community impact, although it is hard to be sure from the data we have. Below, we will cite a case that suggests that EWB presence did contribute to ongoing conflicts.

Across all of our data, we see again and again that the difference between a successful and an unsuccessful project (and thus this difference between a positive impact and a neutral or potentially negative impact) comes down to a few common factors: the quality of the NGO that the chapter is working with; the relationships among the NGO, chapter, and larger community; the pace and timing of when work is completed on a project; and lack of understanding of community dynamics. Views of "community" are especially important. We have been very struck by how often EWB participants, in documents and in interviews, treat "communities" as undifferentiated entities that share unified goals and needs. When asked about this, most members are able to comment on gender or class differences within communities, but those do not always get factored into project design and are not always taken into account when working in communities. If communities have large political rifts or splits, or if there are different needs among different groups, this can lead to project failure, especially when these community differences aren't noticed until it is too late. In at least two cases we examined, it is possible that the conflicts were indirectly caused by EWB actions, although it is impossible to tell for sure given the information contained in documents. In cases where communities are relatively small and the project is able to serve a need widely shared, a lack of awareness of internal community dynamics does not overtly impact the success of the project. In order to illustrate these differences and the positive and neutral/potentially negative impacts that follow, we will provide two short case studies.

*Positive Community Impacts*

In this project, which we learned about from participant observation with the team and a series of interviews with all members who were present on their last trip, the EWB chapter at a large mid-western engineering school worked to complete a water distribution and chlorination system

[2] https://www.ewb-usa.org/introducing-ewb-usa-2-0-shifting-course-greater-impact/

in a town of about 400 people in rural Latin America. The chapter is very large, with multiple programs and projects. The chapter has excellent student leadership that maintains participation, plans for future leader succession, and has been successful with fundraising. This leadership has allowed them to fund regular trips and plan for them adequately. There have been plenty of student participants to share the work needed to make their projects successful. The students who are involved in the chapter are highly motivated to contribute to the project (largely due to the potential for travel). The typical participant is well-prepared for the engineering curriculum, with many entering school with several AP classes that gave them credit for required classes. The students are, for the most part, able to pay for a large portion of travel and are not employed outside of their EWB and course work. The project lead on a water distribution system has a construction background and even provided his own tools for the team. The chapter incorporates reflection on their projects including discussions of ethics and their experiences.

This chapter is also working with an excellent NGO. Although it is run by individuals who are far wealthier than the average person in the town, they are responsive to community needs and provide resources such as transportation, email, and constant communication with the team that facilitated the project's successful completion. In addition, the project has been successful in part due to the characteristics of the community. The town is relatively small and close knit, with most residents being from one or two families. There is also a water committee that functions very well, including a reasonable fee structure that is affordable for many community residents which collects money for maintenance of the system. The project also benefited tremendously from a local community contact who has some engineering training but doesn't work as an engineer. In addition, local skilled tradespeople were also available for electrical and concrete work.

Overall, the team did seem to have a close and trusting relationship with the NGO and key community leaders. Language barriers were accounted for by the team who brought extra Spanish speakers (for example, when one of the researchers on this project traveled with the team, a political science student participated to contribute his language skills). There was a clear consensus about needing reliable access to clean water. Most people in town used the existing water system mostly for washing, bathing, and sometimes cooking (after it is boiled) and bought bottled water for drinking–a significant expense given low income levels. There are only two families with private access to a well. Otherwise, water is accessed from a shared well. A partially functional distribution system installed by the local municipality existed prior to the team's involvement; a well and well pump existed too. The team added chlorination, a sedimentation tank to remove heavy minerals that can clog pipes, extended piping, and redesigned some aspects of the system so supply is reliable to all areas of the community. Water was flowing everywhere (even at the top of a large hill far from the well) and E. coli free. Implementation was completed in January of 2017; ongoing monitoring of the system has not begun.

One of the project leads, in an interview, discussed how the team was lucky to have a unified and enthusiastic community and recounted times when the team was quite willing to change plans when community members stated objections or expressed different preferences or needs. He stated:

> We've struck gold with [town name], they've been real friendly and I think that they–they haven't said no to anything we've done. They've always been all for it, all for our design changes and our plans....[But] when helping other people you don't

> have to come with the mentality that you are above anyone else. You might know what is the best way to do it on paper as we have the formal education, but that doesn't mean that its going to work for the community in real life. So while you might think you are the one that knows and have all the knowledge you have to be, sort of humble? In a way? It might be the best way...but it [might not be] the possible way for the community. You are here to learn as well...When you're helping others, just don't start to think you have the last call on something. You're definitely going to learn.

In the end, both community characteristics and the team's willingness to work closely with them created a successful project that, at least for the short term, has had demonstrable positive impacts in the community.

*Neutral (Possibly Negative?) Community Impacts*

In many ways, the EWB Chapter involved with this project looks much like the one described above. It is located in a very large engineering school at a West Coast public university. The chapter is large with many student participants and multiple programs and projects. The students in the chapter are engaged with EWB; we have met many of them at conferences. The school is very selective, so we assume students are as well-prepared as in the school above, but we don't have information about the students involved in this project in particular since this information doesn't appear in project documents and wasn't covered in our interviews. We also do not have a lot of information about chapter leadership or the chapter's internal organization.

Project documents reveal the chapter made regular trips and had plenty of funds available, but the timeline slowed as their work with the community progressed for a couple of reasons. First, the scope and nature of their work changed three times. This was apparently at "community" request—it's unclear however, from project documents, if the changes reflect changing needs/priorities, changes in the political situation, changes in the priorities of the NGOs, or simply the gathering of more information about needs by the NGO. There were also delays due to lack of labor or weather (the team made a couple of trips in July during monsoon season). On one trip the team was unaware of a community festival that meant work could not proceed as planned. Communication issues between the team and the community and the team and the NGO also slowed progress (see below).

Early in the chapter's work in this community, a corn kerneler was provided to the community that was not in use when assessment was conducted on a subsequent trip. The team then successfully built a sanitation system for a single family which was in use and functioning. A couple of years into their work, the team began a larger wastewater system for village (consisting of a large sedimentation tank and terraced bio-filtration media tanks). The project was never completed and the relationship with the community ended. The sanitation project went on for over five years, and, at the end of that time, the project was less than half built and the team estimated that completion would take an additional two years.

In early documents, the NGO is described as good to work with and tied with the community. In later documents it becomes clear that the students learn that the NGO's work was supported by only about half of the community. In early project documents the community is presented as relatively homogeneous, while, in later project documents, the team notes that there are large

class divisions (farmers with no cash income, very poor members with no access to working toilets) and the role of caste divisions is also noted.

By the end of the project a severe rift among community members eventually ended the team's work in the village. The rift centered around the hiring of non-community members to do labor on the project when hiring of residents was promised. The NGO decided to save money by hiring migrant labor from a neighboring country and this seems to have created anger and eroded much of the support for the project (which may have been limited to begin with). By the end of the project team members concluded that the community never supported their sanitation project and were unlikely to use the system. This situation was not apparent to the team while work was ongoing due to lack of communication with community members.

One of the last documents in the project notes that the project created negative "unintended consequences," and this indicates that the team interpreted the situation as one in which latent divisions in the community were made worse and tension was created when the NGO used resources to employ outsiders in the context of local poverty. Documents also show that the team had very limited communication with community members and what little did occur was heavily mediated by the NGO. The NGO would not facilitate direct communication with the community—as one document mentions a community survey was "impossible due to political issues." Our interviewee's perception (she is a student EWB member who was heavily involved in the project) was that the NGO didn't want them to talk to people who didn't support their work. The team was eventually able to talk to a group of women:

> It was very interesting hearing their perspectives verses the NGOs, realizing that even though the NGO poses to be our friend, and we have a good connection with our NGO, because all our information was through the NGO, we aren't able to have a good connection with community as a whole because of how they view the NGO.

Language barriers were also a huge issue that were not addressed effectively by the team. The team basically was only able to speak to children who knew English and NGO personnel. Documents noted that the team used children as translators which became problematic. By the very end of the project the chapter looked into hiring translators, but it seems the project was closed before this occurred.

Overall, knowledge of the village was limited through much of the project. Bringing an anthropologist as a mentor on one of their last trips helped them learn more. Interestingly, the anthropologist mentor was a fortuitous addition, made only because an engineering mentor couldn't go due to a family emergency. As our interviewee reflected: "When we started we were addressing the community's needs, and it was only over a long amount of time that we realized that the community is a lot more complex. And that's because we brought an anthropologist over; before we still only had engineering mentors, and so it was harder to really gauge community." Later in our discussion she said:

> I think that my project definitely has exposed me more to some of the greater challenges of community work. And also challenges, like *Engineers* Without Borders itself, just the title [Emphasis in original]. Because if we were still a group of engineers going, I feel like we'd be a lot more project focused and we might still be continuing this project. But when our group branched out and got an anthropologist

> on board and started really re-working the project, that's when we realized "ok this needs to change"...We decided to focus more on community and less on implementation, and with the anthropologist, it really helped us realize that like, hey, maybe our assessment trip was wrong and we should spend some time reassessing.

As a result of this increased knowledge, the team concluded in a project document: "Due to miscommunication with the NGO and political issues within the community, it is difficult to efficiently continue building and we are unsure if the average community member will want to hook up to the system because it is associated with the NGO." A description of why the project was closed notes that "support for the sanitation tank came largely from the NGO and not by the community at large." In another document the team noted the following about lessons learned: "...it is imperative that communities are assessed for longer periods of time and that educated personnel (such as anthropologists or natives) give their opinion on the feasibility of the community-driven aspects of projects before moving forward."

Our interviewee summed up the project in this way:

> The construction methods that we used were okay. But even though we had professors and professionals, I'd say our walls are very warped...Communication with the community could have been better... Overall it wasn't the best project, and it definitely humbled me and made me reflect on EWB as a whole. I'd say that the project wasn't a failure though because EWB is all about students it says. As much as we want to say it's for the communities, it's really about the students for the club. Because if you think about it realistically, okay we're doing a couple assessment trips, but you don't really gauge full community needs through a few weeks. I'm a firm believer in that. So, okay, you can try, maybe do a few small projects, and if you're ambitious maybe you'd get a large project, but as far as long term success, I wouldn't really say it's as much for the community as it is for the student. This is really a student organization and a way for students to understand the complexities of development, less so than it is about the community.

**Discussion**

It is clear from our data that students get many positive benefits from their participation. It should be noted here, however, that we are only getting a particular slice of all EWB members–those who are willing and able to attend conferences and have been heavily involved in the organization. It is far less clear, from the data we currently have, what the positive or negative outcomes are for students who are less involved. Faculty interviewees note that all students gain a tremendous learning opportunity, but it is likely that this learning pertains more to technical problem-solving skills and, further, that many EWB participants do not or are unable to fully realize that opportunity. Student chapter leaders on at least a couple of occasions have brought up frustrations surrounding chapter members who are more narrowly focused on design or travel and do not embrace other lessons or seek skills in non-technical areas. Nevertheless, EWB provides an invaluable and rich learning experience for those students, like our informants, who embrace a fuller range of opportunities.

On the other hand, impacts on communities are mixed. Students are not always equipped to handle the complex community dynamics they encounter, NGOs can help create positive community outcomes or might have agendas or practices that hamper projects, and the presence of outsiders can exacerbate community divisions. EWB-USA acknowledges these challenges and has made continual improvements to try to mitigate the potential for negative or neutral community outcomes. "EWB 2.0," a new initiative that will create in-country offices and limit the geographic scope of EWB work, is the most recent attempt to focus on what is done well and foster more positive community impacts. The incorporation of mentors and students with language skills and social science skills, more careful vetting of NGOs (which is one motivation for in-country offices), enhanced training on the importance of seeing communities as heterogeneous, and explicitly making sure differences are accounted for in project assessment are all important best practices that should be implemented more widely.

However, it is also important to note that project timelines, even in the best of circumstances, will present important challenges to creating positive impacts. At the very least, project implementation is slow given travel and student schedules. One student interviewee expressed this concern nicely:

> But for them [community members] to be like, "ok so they're gonna come do a survey, and in a half a year they'll be back to do the rest of that survey, and in half a year they might be bringing materials." So I think just the nature of that kind of protracted time line, um can serve as a disconnect. And even after two implementation trips, coming in and having had enough time pass, or having kind of the political winds blowing, means that you start over with a more community engagement, kind of trying to reconnect, I think that's a struggle that a lot of chapters have to overcome. How to keep the faith, keep the community engaged despite the differences in our kind of, timeline.

Short trips in and out of communities present important roadblocks in learning the social dynamics and the variety of perspectives and needs that community members have. Good NGOs have the potential to aid in gaining this knowledge, but the literature on NGOs makes it clear that it is incorrect to assume that NGOs will be any closer to "community" than outsiders [19–22].

EWB has created many positive impacts, but the fundamental situation that privileged outsiders are coming into communities in developing countries is a reality that all chapters and participants must grapple with. The broader discussions about development and the need to avoid being "saviors" that occur within many chapters are helpful for projects and provide an important lesson for students about privilege and their place in the world, if they are willing to engage with the difficult concepts and decisions they face. In the end, it is likely that, in the aggregate, students will continue to benefit more from these interactions than communities will, but we remain hopeful that the benefits students gain will continue to come along with some very concrete positives for communities and can help build an engineering profession that is more attuned to issues of social justice, global inequality, and sustainability.

## Acknowledgments

This work is supported by the National Science Foundation under Grant No. EEC-1540301. Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the views of the National Science Foundation.

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