

Engagement in Practice: Not Just Technical Education; An Anthropological Perspective on a Community-Based Engineering Internship Program

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Learning By Doing

It is a cornerstone of much contemporary educational practice that the most effective learning occurs “by doing” as a subset of “active learning,” whether in the classroom or in extra-classroom activities (e.g. Felder and Brent 2003, Flowers 2007, Wells and Edwards 2013; note the existence of a journal, *Active Learning in Higher Education*, devoted to this). For this reason, internships have become widespread in engineering education (e.g. McCormick 2017). The benefits of an internship derive not only from the application of STEM concepts learned in the classroom to real-world problems, but also from the experience of managing relationships with project team members and external stakeholders. Moreover, the authenticity of an engineering internship relies on the interplay between the technical and interpersonal issues that arise. This case study is of a community-based summer engineering internship program with 22 participants who were students at 6 different educational institutions in a midsize Midwestern city: a private research university, a local campus of a state university system, a community college, and 3 high schools. The internship program focused on a set of issues impacting a single economically and environmentally challenged neighborhood in this city, including public safety, stormwater management, repurposing of vacant and abandoned properties, and building on a sense of pride of place among the residents.

Two undergraduate anthropology students studied, ethnographically, the interactions of the interns (e.g. Bernard 2011). They spent all 10 weeks observing the interns’ daily activities, participating in group events, conducting interviews, and analyzing interns’ periodic reflections. Two anthropology faculty met regularly with them. This paper principally relies on their anthropological analysis.

This paper highlights some of the successes and challenges involved when the number of participants, each with diverse skills and goals, is high. We first consider the *criteria for success* of the internship program in terms of both *physical improvements to the neighborhood* and *educational benefit for the interns*; we define a framework for evaluating the impact of interpersonal relationships on achieving success. A key concept in this framework is how perceptions of *legitimacy* among team members and between the internship program and the neighborhood impact success. We next apply this framework to two *case studies* of situations that arose during the program: the transport of materials during the construction of rain gardens and dealing with “mission creep.”

Success

The program began with a week of team-building and orientation. Interns engaged in leadership training, getting to know their teammates, interactions with the community, and learning about specifics of the job. This acclimation period emphasized the program’s twin goals: 1) *To achieve something tangible for the community*; and 2) *To educationally benefit the students involved*, with attention paid to interdisciplinarity and skills for application. The interns collectively negotiated the group’s code of conduct and discussed expected goals. A bottom-up, community-focused approach had always been a top concern for the project even before the internship period, as signified by the oft-repeated phrase: “We are working with and for the community, not *on* the community.”

Community desires alongside the individual passions of the interns became sources of inspiration for the introduction of new goals for the project. These two forces intertwined at the project's most significant community interaction event: a program-sponsored community picnic held on the first Friday. Interactions with neighborhood families and city officials, including the mayor, were highly influential, as interns noted in exit interviews the importance of this event, which influenced interns' decisions about their individually chosen projects, determined early in the second week: Many interns decided to work directly on the park or pursue other suggestions obtained from the community during the picnic. Three interpersonal factors emerge as principally responsible for the success of the program. We term them *responsiveness*, *engagement*, and *improvisation*. The interns' efficacy in achieving the goals of the program occurred when these three interpersonal factors were aligned with the technical skills brought by the team. The rest of the paper will consider the dimensions each skill added in bringing about the success of the project as a whole.

Responsiveness

In the week before the program was to start, program leaders heard news that gunshots were fired in a local park just a few blocks from the program's central headquarters. This event was to play a major role in shaping the the program. Early on the first day, amidst basic introductions, students were informed of the event. Two conversations emerged around the event during that introduction: one oriented around what it means to do work *with* a community rather than *on* a community, and one oriented around questions of safety.

The first conversation, as mentioned earlier, became one of the oft-quoted mottos of the interns, especially when pressed to explain their activities and goals to others. The selection of a community arts center located within the neighborhood to serve as internship headquarters, was emblematic of this creed; many noted that any of the institutions of higher learning from which the interns were drawn could have provided space. Choosing and, more importantly, staying at that site following the safety concerns brought up was integral to this program directive. The frequent use of "neighbors" to refer to members of the community in which the program operated also served to signify the desire to maintain a horizontal relationship.

The second conversation, around safety, became the context for demonstrating *responsiveness*, meaning the redirection of core values as a reaction to shifting contexts surrounding the program. Although attention was paid to the predefined projects and original core goals of the program, this event brought heightened motivation surrounding projects concerning the park. Particularly, when given opportunities to select personal projects to work on alongside the predefined projects, the greatest engagement occurred in many students choosing to work on projects related to the park, despite the number of other projects available in the neighborhood. Some students worked directly on park-related projects; others assisted collective efforts to work on the park. Notably, several interns became interested in questions of safety, exploring options for security cameras, lighting, and other preventative measures to improve the park's safety. Other efforts were devoted to children's safety. Soon after the mayor attended the first-week community picnic, the city took action to replace concrete areas with plastic mulch, to conduct research into alternative paint options, to install a water fountain, and to replace stretches of sidewalk. Interns had their hands in communicating neighborhood desires to city officials as well as assisting in intellectual and physical labor for these projects.

The demonstrated responsiveness became the grounds upon which deeper community engagement began to be built. Relations first built during brief meetings at the community picnic

became strengthened through the actual changes that the program was able to bring about through employing its connections in the city government as well as the through interns' demonstrated continued attention and motivation. Responsiveness was thus the first step needed to gain legitimacy in the neighbors' eyes in order to gain deeper relationships in the process of community engagement.

Engagement

The early motivation resulting from the shots fired at the park did not die down throughout the program, but continued throughout the entire internship and helped transform the park into a space for engagement with the community. Although much significant work had been done to develop relationships with the community, there was still a sense that only particular members of the community, especially those most active within the neighborhood association, routinely interacted with the program. Despite the program headquarters' official "open-door policy," consistent with the "neighbors" mentality, it remained a space very rarely entered by community members, in part because few knew of the existence of the community arts center and incubator. Several interns made efforts to transform the park into a space for greater engagement, especially with community members who lacked reasons to enter the program's headquarters. One intern spearheaded efforts throughout the internship to simply go to the park and talk to individuals hanging out there. A high school student intern who lived in the community herself put significant effort into a number of projects in the park, including a suggestion box through which community members could contact the program and a little free lending library. These efforts further helped transform the park into a space for community engagement.

Engagement involves establishing a continuing relationship with community members and partners, again signified by the use of the term "neighbor" to refer to community members. The designation of "neighbor" imbricated the long-term fate of the program with that of the neighbors. This discursive formation was intentionally employed to avoid the potential for the program to simply become a unilateral aid project. This was especially necessary as a number of interns, program leaders, and resources were sourced from the most advantaged, but most remote, educational institution. Several members of the program from other institutions--a deliberate design of the program was this kind of institutional diversity--expressed concern over the potential for the project to serve the needs only of that institution. The program leaders had anticipated the potential for both this perception and the actuality of that institution's dominance.

Although they were neighbors in the sense of physically occupying property in the vicinity of other community members, the program and its individual members had to gain, nourish, and develop legitimacy with community actors in order to become neighbors in the deeper sense of having a lasting co-relationship with community members. Thus, legitimacy was a prerequisite for fostering deeper community engagement. The program as a whole gained legitimacy through repeated demonstrations of its responsiveness to the events leading up to the start of the internship program. However, some members of the program brought other experiences of community interaction even prior to the program's start; some were older and lived in the city, and had worked on the pilot project the year before. Furthermore, legitimacy also served other functions than enhancing community engagement, such as maintaining internal cohesion within the program. Thus we speak of multiple forms of legitimacy. Such forms were differentially possessed and employed by members of the internship for different ends. Below are the forms identified during the course of the program, along with short descriptions.

Forms of Legitimacy

- Leadership: Authoritative legitimacy held through being awarded formal positions of power within the hierarchy of the program.
- Prior Internship Experience: Familiarity with other returnees to the internship, the internship itself, and local resources.
- Local Residents: Able to employ knowledge of the region and experience both within the program and in interactions with the community.
- Community Leverage: Relationships with powerful members of the community that were able to assist the program.
- Educational Leverage: Connections to educational institutions and attendant resources.
- City Leverage: Connections with officials in the city government

Each form of legitimacy was susceptible of being misemployed, as for example when one team member would try to speak authoritatively using their leadership in situations where they lacked formal positions of power. One intern employed both prior internship experience and time spent developing relationships with members of the community to become an important connection with the community for the program. Legitimacy could also be developed through the course of the program, as in the case of another intern who developed strong connections with people across the city by being particularly active in the city's summer internship program. Some forms of legitimacy were especially effective at engaging community members, as seen when the intern mentioned above who lived in the neighborhood and worked on the park was able to get community members to rethink their approach to investing in the park by appealing to her unique identity characteristics as a young member of the neighborhood. At other times, educational background was often a *barrier* to both internal cohesion and community engagement as motivations for action were framed by complicated power relations.

The interplay of the forms of legitimacy, and the speech acts used to employ those forms, was a source of both tension and cohesion. However, it was analytically clear that properly balancing and employing those forms was important to achieving tangible solutions to community issues as well as educational benefits for the students involved. Furthermore, *proper management of the legitimacy of both the whole program and individual members is the most important factor for continued success in subsequent years*. Replicability, both of this program in the future and of similar programs in different contexts, would rely upon the ability of participants (both leaders and interns) to develop the interpersonal relations necessary to employ legitimacy to achieve internal cohesion and to engender community engagement.

Improvisation

Despite our focus so far on the interpersonal, we do not suggest that technical skills are in some sense less necessary; we do not wish to reify a strict division between the "social" and the "technical." The variety of technical skills brought to the project were all important to the successes accomplished. Such skills were not only engineering skills, but also artistic, writing, and research skills. Most importantly, to be successful the interns had to learn to creatively adapt their skills to emerging issues. They had to improvise. However, *improvisation*, seen here as quick technical responses to shifting issues, was not only an individual quality but a function of the team as a whole.

Internal coherence as necessary to improvisation

For teams of intern to function well there had to be some measure of internal cohesion and internal coherence of goal. *Cohesion* here refers to the ability of the interns to work well together. Based on the model of legitimacy offered so far, cohesion was gained when legitimacy

was properly employed to bring the multiple interests of the interns in line with a common goal. Thus, internal coherence is how clear, and to some extent how efficacious, that goal is. The following section will discuss the interplay of coherence and cohesion that led to successes and failures of improvisation during the internship.

Case Study: Materials Transportation

A large portion of the summer internship was spent constructing rain gardens. This was the largest project, utilizing every intern on designated days and demanding the most time and resources of any of the projects. Because of all the moving parts and labor necessary to complete the tasks on designated days, with all the interns devoted to the project, it was necessary to engender cohesion. Communicative technologies, clearly defined tasks, and incentives such as meals and trips to get ice cream were all useful to creating the conditions necessary for success. One recurring problem, however, was materials transportation. Very often, there were excess and difficult-to-manage materials, such as mulch or sand, left over following successful installation of a rain garden. On some days, some interns spent as much time moving and storing materials as they spent constructing the rain garden. This threatened cohesion, as many interns expressed displeasure over the seemingly unnecessary work and questioned the choices of the project managers that led to these situations. However, one of the project managers consistently managed to engender cohesion by successfully manipulating legitimacy. She/he regularly used public opportunities to praise people who were particularly helpful or volunteered to work on material transportation. She/he never directly employed legitimacy as a leader to command others to deal with the problem, which would be a mistake in that it would focus attention on the project manager's role in creating the issue. Instead, she/he utilized narratives of the "common good" to abstract the issue and make it an unmarked problem. This occurred as both internal to the group ("It would be really helpful to me/us/them if these materials could be moved") and external to the group ("We can't just leave the sand here, it will make the neighbor's yard look bad/spread into the street/etc.").

Case Study: Mission Creep

Those strategies were particularly useful because the goals of mutually learning from one another and benefiting the community were firmly embedded, with had high coherence as a result of being inculcated throughout the training and teambuilding processes as well as prior experiences during the internship. Coherence and cohesion interplayed to create conditions necessary to finish a task. Aside from those two basic goals, however, interns often felt that the program as a whole lacked coherent goals. This was largely attributable to the highly abstract, flexible, and long-term goals that the program directors held. In other cases, students were ill-suited for jobs in which they were placed and thus didn't know how to handle their position given their skills.

These are issues that can plague any program. The greatest threat to the coherence of program goals, however, came from one intern's concerns about the program's overall directions. This particular intern, older than many of the other interns, had participated in the program during the previous year and so had experience observing the growth and changes within the program. Although the program was intentionally oriented around fulfilling the intellectual and practice needs of students from a variety of backgrounds, a number of activities did not appeal to all students. In general, many activities were designed for university students from the most powerful educational institution, who also formed the largest subgroup of the program. This intern felt that the program had shifted from its initial goal of cleaning and maintaining local

waterways and otherwise achieving tangible solutions with the community in order to cater to students from the powerful university, especially as more funding came from sources investing in the outcomes for such students, particularly engineers. The logics of many of the tasks seemed to run counter to the goal of helping the environment and community, as activities such as workshops and installation of sensors seemingly took time and resources away from the central goal. This sentiment was shared to varying degrees by a few other interns, making it a larger threat to the coherence of the program, especially as some members of the team felt their work was underappreciated. The critique, in its most formalized conception, was referred to using the military term “mission creep”: the dilution of a task or goal as more ancillary goals are added.

Insofar as it actually occurred, mission creep could be attributed to the organization’s growth as it sought *new funding sources* and *sustainability*. These factors were frequent topics of discussion, as many of the subprojects involved researching them to create self-sustaining solutions in the community. Viewed from an organizational level, this idea of mission creep could be viewed as improvisation of the entire organization in response to shifting funding sources, or conditions for achieving their goals. Apparent abandonment of core goals can appear in any organization as short-term shifts are made in order to accommodate new expectations from funders, the interns themselves, or other influencers. In this case, the problem could be attributed to a failure to maintain internal coherence of the program goals during the process of improvising. Alternatively, it could be argued that the goals always included the program’s expanded activities, but without the resources or initiatives to act on all of the goals. In this case, the internal coherence of the goals of the program, though clearly established among the program directors and certain other people, was not extended to the internship as a whole.

Conclusions

Any complex internship program with multiple stakeholders, aiming to work with community partners, must confront the authentic challenges outlined in this short paper. These challenges evoke emergent responses which may not be entirely predictable, but which may lead in new and potentially successful directions, both for the learning of the interns themselves and for the community partners whose lives are to benefit from all this activity.

Sources

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