Understanding Impacts: Community Engagement Programs and Their Implications for Communities, Campuses and Societies

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Abstract

As universities increasingly involve engineering students in sustainable development work through community engagement, challenging questions arise regarding how to effectively serve the interests of both academic and non-academic participants. To date the literature on community engagement strategies such as service learning, project-based learning, and community-based research has had more to say about student experience than about implications for the university more broadly, or—critically—about impacts on community partners and community wellbeing more generally. While the potential for "real world" impact animates student learning and makes engagement meaningful, broader impacts can be hard to conceptualize and assess; arguably the more potentially consequential the impacts, the more they are likely to be mixed and hard to understand. This paper presents a simple model for thinking about community engagement program design and assessment at various scales of impact, across both academic and non-academic communities. We illustrate the model with examples drawn from a program operating in Cape Town, South Africa, where students confront a paradoxical challenge: nowhere are engineering insights and contributions more desperately needed than in the burgeoning urban informal settlements of the developing world that are home to 1/7th of the world's population, but the sustainable development strategies and cultural assumptions that academics carry with them often come undone in the social, environmental, economic, and institutional maelstrom that typically prevails in these areas. How then, if at all, are we as educators, engineers and/or community development practitioners to engage with students and community partners to advance sustainable development in such environments? How do we plan for

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and measure program success (of what? for whom?) in a context especially prone to failure of things built and relationships nurtured? How in short do we foster engagement that is thoughtful, collaborative, resourceful, respectful, hopeful, resilient and beneficial to all concerned?

1 Introduction: Models of Engagement Between Academia and Communities

Universities and colleges have been rapidly expanding programs that engage students and faculty with communities of various kinds in order to engender new forms of education, new insights into complex social-environmental challenges, and new forms of societal contributions from academia. While community engagement programs seek impact by promiscuously mixing education, research, action and social roles (all involved can be educators, learners, planners, creators), programs are typically informed by conceptual entry points that emphasize either (1) *student learning* (e.g., service learning, experiential learning, project-based learning, faculty-led international study), (2) *faculty research* (e.g., Community-Based Research, Participatory Action Research, etc.) or (3) *community development* (e.g., Asset-Based Community Development). With such diversity in program considerations and perspectives and a rapidly evolving landscape of initiatives, there is growing interest in how to better conceptualize and assess the impacts of such programs.

Most analysis to date has focused on student development in areas such as knowledge, skills, attitudes, and identity (e.g., Bielefeldt et al. 2010). In contrast, far less is known about program impacts on organizations that partner with universities and less yet on wider social impacts (Beckman et al. 2011). Such impacts are hard to assess both in real time, when insights may be critical to modifying goals and methods and nurturing collaboration, and retrospectively, when there are typically few resources available to tease out causal connections amid myriad overlapping outcomes, some of which continue to evolve long after the program ends. While formative assessment during and summative assessment after project completion may therefore be difficult, this should nonetheless not obscure the value of thinking explicitly and strategically about intended outcomes *prospectively,* when designing (or redesigning) a program, if one hopes to maximize common cause among partners and the potential for achieving meaningful outcomes.

At one end of a spectrum of engagement are service learning programs that Stoecker et al. (2010) criticize as proceeding from a "charity" orientation that typically puts individual students to work in communities, sometimes with little

preparation and operating from an institutional perspective that can reify strong, imperialistic notions about the nature of social problems: "educated" individuals (students) discharge the academy's social responsibility by educating and thereby empowering others (community members). While of some potential value to individuals, the "doing for others" discourse underlying such approaches can in fact be disempowering and belie a dominant concern with *student* outcomes.

At the other end of the spectrum are programs that take community development as their fundamental basis, prizing much deeper commitment to local participation and community action and impact than has been characteristic of most academic research (Stoecker 2012; Stoecker et al. 2010; Beckman et al. 2011). Academic and community partners are increasingly turning to project-based approaches to "sustainable community development," a term we use broadly to mean strengthening the capacity of local individuals, organizations and agencies to improve the social, environmental, and economic health and vitality of "their" place and prospects for future well-being.

Despite growing interest in such programs, educators and local partners have few models to help think about how projects might positively (or negatively) impact participating organizations and through them wider aspects of community life (e.g., through changes in policy, programs, networks, built environment, etc.). In this paper we propose a conceptual model to fill this gap and illustrate its application using examples from a program operated in Cape Town, South Africa by Worcester Polytechnic Institute.

2 Thinking About Community Engagement Impacts

As a point of departure, we borrow from Stoecker et al. (2010) who offer a simple model of community impacts developed with participatory action research (PAR) practitioners. The model frames impacts at four scales—*individual relationships, organizational partnerships, community* and *system*, the latter being wider social systems that shape how communities develop. They argue that impacts should broaden over time, as community engagement efforts move from an initial focus on *research* and planning to *action* in the form of programs, structures or other outcomes with wider potential for impact. *After effects* can broaden impacts further, as when a successful program in one community informs policy or efforts elsewhere in areas such as public health, safety, economy, or environment.

Table 1 and the discussion below broadens this model to: (1) consider impacts on both *academic* and *community* sides of the engagement, as impacts are by design intertwined and often surprisingly symmetrical; (2) consider impacts first as a guide to program planning and aspiration, valuable even if assessment processes are weak and/or yield unclear results; (3) elide the distinction between research and action that doesn't apply meaningfully in the case study nor in how many communities think about the value of engagement; (4) credit more fully than do Stoecker et al. (2010) impacts at *individual* and *organizational* levels for both their intrinsic value and diffuse but real potential for meaningful immediate impacts and "after effects;"

Table 1 A model of potential community engagement impacts

	Community Actors (Academic Actors)	Potential Impacts Communities ←---→ Academics
System-Level Impacts	Political leadership structures Social movements Media and opinion leaders (Higher education system)	Policies and policy discourses changed/strengthened Strategies diffusing to other communities Institutional and financial resources flowing toward positive outcomes Proliferation of collaborative engagement models
Community Impacts	Key groups: children, ill, entrepreneurs, elderly, etc. Built environment (The university community)	Social programs operating successfully Social cohesion and decision-making enhanced Community sustainability enhanced Built environment improved Health and well-being enhanced
Organizational Impacts	Community, Non-Profit, Government, Business, Cultural, Educational Orgs (Academic dep'ts. units...)	Strategic planning and project development capacity Ability to collaborate and foster participatory processes Assets & Resources: ideas, data, reports, money, programs, facilities Networks, reputation and influence
Individual Impacts	Co-researchers, community leaders, local professionals (Students as individuals & in teams, faculty advisors)	Cross-cultural learning & empathy Confidence and sense of efficacy & contribution Project development strategic thinking and competencies Teamwork insights and skills Communication skills Professional development & asset accumulation Personal growth in realms deemed important by each individual

and (5) similarly, to be less dismissive of program outcomes that may fall short of systemic impact but that for many students and community partners can be vital learning and skill development experiences and tangible, meaningful forms of participation. Thus, while we strongly support strategizing that aims to grow impacts over time and space, as suggested by the large arrow in Table 1, we also fully appreciate the beneficial outcomes that can occur at all scales of engagement.

3 Applying the Impacts Model: A Case Study Discussion Based in Cape Town, South Africa

The Cape Town Project Centre (CTPC) was established by Worcester Polytechnic Institute in 2007 as part of the university's Global Projects Program. Each year, about two dozen students participate in the CTPC to complete interdisciplinary research projects (WPI 2015). The projects are a general education requirement intended to help students better understand connections between scientific and technological advance, social issues, and human need through an intensive problem-solving experience. Most projects are completed off campus at one of 40 project centers where multidisciplinary teams of three to five students address project challenges posed by local agencies, typically NGOs, non-profit community organizations, or government agencies. The projects "belong" to the sponsoring organizations which, along with WPI faculty advisors, guide the students and afterward advance project outcomes as they see fit. Key learning objectives for students involve critical thinking and writing, research skills, collaborative problem solving, and appreciation of the project's social and cultural context. The program

includes a two month preparation term and two month field term, and students earn total credit equal to 4.5 courses.

Whether at home in Worcester or in London, Bangkok, Washington, Cape Town or elsewhere, the Global Projects Program (GPP) has student learning as its primary aim, achieved as students advance the interests of local organizations by serving in a junior consultant/project developer capacity. The program has expanded rapidly, involving over 750 students—more than 70 % of all WPI juniors—in the program for 2015–2016 and drawing on faculty from across the campus. With few exceptions, the program has not been closely linked to faculty research agendas nor aspired to independently advance community or system scale impacts outside academia or the purview of the sponsoring organizations.

The CTPC, on the other hand, has evolved to explore the potential for such wider impacts largely through projects related to sustainable community development in informal settlements, also known as squatter camps or slums (Jiusto and Hersh 2009). Student teams have built the center's understanding of issues and potential responses in such overlapping areas as housing and community centers, roads and storm water, energy, social entrepreneurship and micro-enterprise, with particular aspirations to system scale change in the areas of water, sanitation, and hygiene (WaSH) and early childhood development (ECD). Most fundamentally, the CTPC as both a social enterprise and an educational program is designed to support collaborative learning and coordinated action by community members, civic organizations, government and academics to gradually transform community conditions and create new models for informal settlement upgrading practice and policy (Elmes et al. 2012).

To these ends, the program has devised a strategic approach to student and community development called Shared Action Learning (SAL), drawing on PAR and Asset-Based Community Development strategies (Jiusto et al. 2013). SAL emphasizes the porous and necessarily improvisational nature of working with residents in poor communities, and recognizes that strong social, cultural and ecological factors often render unworkable "standard" approaches to community development, including engineering approaches that fail to deal effectively with the deeply social nature of infrastructure (Jiusto and Kenney 2015). Students are forewarned that informal settlements are difficult places to work due to social and cultural differences among key actors, intense contestation over power, resources and decision-making, and an ambiguous legal environment. It is easy for projects to fail to meet the hopes and expectations of diverse participants and stakeholders, and for success to be partial or fleeting.

Where the academic inclination might be to study such a difficult situation and draw insights that can be applied later by others, residents whose participation is ethically and strategically essential to "community engagement" are often impatient with planning processes not tied closely to action advancing their own welfare and that of the community (though the distribution of benefits among direct participants and a wider community is a perennial subject of discussion and some tension). Local activists, non-profit organizations and government also share an interest in action, yet each comes from a distinctly different institutional perspective. With

limited resources and few successful examples to draw upon, a "learning by doing" approach is often unavoidable, but can spark community consternation ("Why are we being experimented on?") and fear among government and NGO professionals that trying and failing can be more threatening than doing nothing. Students and faculty can bring distinctive insights and assets, as well as liabilities, to navigating such a complex environment; in turn, the challenge these projects present can help both academic and community participants develop new, highly transferrable insights and skills.

4 Analysis of Individual Scale Impacts

The CTPC's core animating engagement is between WPI students and community "co-researchers": residents with demonstrated commitment or capacity for community service selected by local partners to work with students and share a unique learning experience. Immediately surrounding this core is a typically more professional cadre of WPI faculty advisors and staff of local organizations and agencies who simultaneously support students and co-researchers but who also potentially experience personal learning and growth themselves. The goodwill many people feel toward students and the collaborative model can foster a particularly rich environment for mutual learning across social, cultural, disciplinary, and sectoral realms. U.S. faculty can learn much from co-researchers, social movement activists, local professionals and politicians as they collectively struggle to "make something happen."

A recent alumni study found that participation in WPI's off-campus project program strongly fostered long-term impacts related to professional achievement and personal development (Vaz and Quinn 2014). On average, students participating in the CTPC report higher levels of challenge and accomplishment than students in the program overall. A total of 184 participants over seven years rated the intellectual challenge, their level of effort, and the educational value of the experience an average of 4.9 on a scale of 1–5, with similarly high ratings for gains in critical thinking, communication, and project management. These findings are corroborated by consistently high ratings given to the written work of CTPC students by program reviewers. Most Cape Town students reflecting on the experience in real time and after returning home express deep gratitude for the experience, in particular describing lessons of strength, resiliency, positivity, and even love taught them by the community members and professional staff they worked with.

Evidence of impacts on local individuals is far less systematic, but the program is designed to support community co-researchers by involving them in determining project goals, means, and implementation, and also expressly asking them about areas of personal growth and learning they would like to explore. Participation is formalized in a letter asking co-researchers to guide and teach students and faculty, as well as be active learners and project developers and representatives. At program's end, they get a certificate of participation and often other professional and

personal development assets (e.g., a revised CV or an online and printed "profile" of the individual prepared by students).

These positive results emerge despite—or perhaps because—the projects are hard, often dealing with intractable and controversial problems (e.g., water and sanitation) with local partners that may struggle to work well together and to sustain initiative. Failure is an ever-present possibility, and the way forward often murky. It is notable, then, that in most cases the end of the project period is characterized by an outpouring of positive emotion and sense of accomplishment. Strong connection between co-researchers, local partners, students, and faculty is the norm. Community participants usually feel some mix of *pride* in what has been accomplished; *empowerment, momentum and new capability* to make directed change; *cross-cultural learning, demystification and confidence* when engaging with others from different social, racial or national backgrounds; *teamwork with local colleagues;* and often unanticipated, even cathartic *personal growth*, strongly echoing the same kinds of personal growth as students.

For local actors, this sense of growth and empowerment is certainly more fragile than for students, and it is not uncommon for individuals to later lose momentum and feel the sense of possibility ebb in the face of ongoing challenges. The daily grind of living amid poverty and crime, of facing jealousies and suspicions that may arise due to project participation, and the inevitable gaps in experience, resources and support can all sap follow-through, as can flaws in the advice and strategies that students and faculty proffer. While most community members have been eager to work with the program in follow-on years, the sense of loss that is the flipside danger to embracing hope is an ever-present possibility to recognize and ameliorate to the extent possible. Despite these risks, local actors generally credit the experience as advancing their potential as community leaders, job seekers, learners, etc. The apparent depth of empathy and cross-cultural engagement noted above is unusual in relatively short study abroad programs in the developing world (van 't Klooster 2014).

5 Analysis of Organizational Scale Impacts

Broader impacts emerge through relationships with local organizations that propose project topics and collaborate with faculty to guide student/co-researcher teams. These groups also contribute centrally to executing projects and supporting community follow-through. CTPC partners include local NGOs such as the Community Organising Resource Centre, a Shack Dweller International affiliate; the Informal Settlement Network social movement; over a dozen City of Cape Town agencies; and more informal community-based organizations (CBOs) such as the Maitland Garden Village Green Light Project. All have different perspectives on what they can contribute to and gain from program participation.

While many city agencies initially proposed "academic-oriented" projects that fit a mental model of internship or research oriented programs (i.e., projects heavy on students collecting and analyzing data and preparing a report for, say, stormwater management in a community), many now value the CTPC's more grounded, action-research orientation (e.g., developing a stormwater plan by designing and building channels with co-researchers, working out in the process systems combining formal and informal engineering strategies). Jiusto and Kenney (2015) demonstrate how such action-oriented, student-community work on stormwater or other engineering concerns can lead also to peer-reviewed publications that speak to academics and practitioners. City agencies that can be risk averse may use the program strategically to test new approaches to vexing problems. The city can represent the effort as one of students and community: success can be shared, failure owned by others. But because the relationship is one of truly *working with* rather than *researching about* local government, staff often devote considerable effort to sharing insights into institutional dynamics in South Africa and strategizing together how to overcome impediments to healthier, more sustainable communities. These insights inform not only project design and execution, but faculty scholarship and the evolution of the CTPC.

Community organizations, on the other hand, generally value tangible outcomes —a crèche (i.e., preschool/daycare), WaSH facility, or youth program, for example —that benefit the community and/or group members themselves. Community organizations are usually shoestring operations or micro-enterprises looking for support and nurturing to become more sustainable. Organizational decision-making processes and resource considerations are perennial challenges. Individual co-researcher and small CBO impacts often overlap; the CTPC benefits from their deep insights into community life and the learning that comes with trying to understand the challenges that social and profit-based entrepreneurs face, and how in two months the program might advance their aspirations and thereby in some measure community wellbeing.

In our experience, the richest sustained organizational impact occurs between our academic organization and the small non-profit organizations that serve but do not necessarily reside within a poor community. The most compatible of these organizations: (1) work on compelling and important issues that resonate with students and faculty; (2) have experience working with students and devote significant time to guiding them; (3) embrace a "learning by doing" development strategy; (4) have young staff members who can benefit professionally and personally from the relationship. The relationship between the CTPC and core NGOs is so symbiotic that our core community development strategies overlap and are pursued together, as we try to use our complementary strengths and assets to imagine, fund, and execute sustainable community development projects. Construction-related projects in particular have become intensive experiments in how to meld diverse parties' distinctly different approaches to design and construction to develop facilities in the difficult informal settlement context where legal and regulatory regimes are inchoate and the building process is fraught with theft,

vandalism, political meddling, compromised workmanship, contestation for job opportunities, inadequate supply of water and electricity, and the like.

NGO and city partners that sustain a year-round engagement with communities now count on the CTPC for an annual infusion of energy, insight and capacity. CTPC student projects in informal settlements in turn would be impossible without the knowledge, advance work and staying power of local partners. These organizations also accept the risks of embracing ambitious work with students and visiting faculty: they can be overtaxed during engagement and left afterward with unfinished construction projects, flawed programs, upset communities, angry politicians, frayed nerves and other miseries.

Despite such risks, CTPC partnerships usually endure over a number of years. Organizations appreciate close collaboration in project design; they get a team of students and faculty advisors rather than individuals requiring individual oversight; and the program embraces action as a research and learning strategy. The program can also sometimes bolster organizations' *finances* (helping with proposals and fundraising—over $500,000 in eight years); *knowledge resources* (data collection and analysis, documenting successes); *staff development* (informal mentoring); *capacity for participatory action* (student efforts as a force multiplier); and *reputation* (visible innovations in settlement upgrading and national and international awards). These benefits are all rooted in the significant time that students and faculty invest in each project, estimated at 2000 or so hours of total WPI effort over four months.

On the academic side, "community organizations" are the academic departments and other units that advance the university's educational and research missions. The CTPC and other GPP centers take on complex socio-technical challenges that involve students and faculty from diverse disciplines, inevitably leading to sharing of ideas not just about the project, but about the nature of social and technological change and the university's mission. Beyond seeding broader academic collaboration, the program also provides a compelling reason for other campus organizations such as the library, student counseling, risk management, health services, financial aid, and others to work together more closely, advancing their individual missions and the university community's sense of collective purpose and accomplishment.

6 Analysis of Community Scale Impacts

Community scale impacts leverage individual and organizational processes to deliver opportunities or benefits to larger social groups, such as children, the elderly or disabled, micro-entrepreneurs, neighborhood residents, or an entire community. While some development professionals, academics and citizens frame project

assessment largely in terms of more-or-less directly measureable community impacts, co-researchers and others often also value how public participation can stimulate subtler, longer-term progress in knowledge, attitudes, networks, experience, and ultimately capacity to leverage "sustainable development processes" to benefit themselves, their associates and their communities.

A small programmatic example is the Green Light Project, a CBO formed in 2011 through a student project with community volunteers to support health, jobs, children, seniors, and culture. Like most tiny volunteer organizations, it relies heavily on the commitment of a few individuals and is thus institutionally vulnerable; but it has become a registered non-profit, recently celebrated its fourth anniversary, and has added a soup kitchen. While the soup kitchen clearly doesn't address the root cause of hunger in the community, it does express residents' desire to reduce suffering and reinforce social solidarity. A team in another part of Cape Town recently rehabilitated a shelter for abused women and children as an exercise in healing and facilities improvement through the strong participation of the women and staff.

On a larger scale, student teams in two informal settlements have contributed to "reblocking," an approach to upgrading in South Africa that partners community teams with local government and civic groups to tear down settlements in stages, making room for roads, sewerage, electricity, drainage and new shack homes reorganized to promote security. These are difficult and contentious undertakings; community members must decide to engage in an uncertain process, contribute financially, engage in spatial planning exercises to negotiate the size and location of new shacks, elect leaders and form construction crews, and face delays and uncertainties at every turn. A student team in 2013 helped advance pre-construction efforts in Flamingo Crescent settlement and a year later another team was instrumental in designing and building a crèche and playground and convening a crèche management board, principal, and teachers. The program also supports non-material project impacts. For example, many informal settlements are communities in name only; residents may know few neighbors and live in suspicion or fear. Reblocking is thus as much about promoting leadership, cohesion, hope, resourcefulness, and capacity to collectively improve living conditions and opportunities, as it is an exercise in effective engineering design and construction under duress.

These engagements also affect the university "community." The Global Projects Program is WPI's most distinctive element, a source of identity and shared pride across campus and an asset for recruiting students and faculty. Arguably, the deeper the aspiration for community engagement and sustainable development outside the university, the greater the need to reinvent the university toward these ends. Not only must the curriculum support project-based learning opportunities for students, faculty review processes must support knowledge creation and academic work that is participatory, applied, culturally informed, multidisciplinary, and in service of diverse social groups.

7 Analysis of System Scale Impacts

The CTPC mission to support learning and action to advance sustainable community development was driven by urgent needs and a corresponding dearth of practical guidance for development practitioners working in informal settlements. Students have built the center's understanding of issues and potential responses in such overlapping areas as roads and stormwater, housing and community centers, energy and entrepreneurship, with particular aspirations to *system scale change* in the areas of early childhood development (ECD) and water, sanitation, and hygiene (WaSH). While far from fulfilled, these aspirations nonetheless inform project choice and strategic risk-taking and have led to promising early success.

The reblocking efforts noted above illustrate an intention to pioneer system change in both the *process of collaboration* among community, civil society and government and in treating upgrading not as a housing problem but as a *community development opportunity*. In that light, a specific contribution that was made to address community concerns about unattended children playing in the street was to integrate plans for a crèche and playground into the 2013 reblocking plan. New ECD partners were also recruited to support a community-based process that in 2014 built the crèche and playground and formed a management team, all part of a pilot project recently endorsed by the Mayor of Cape Town, Patricia de Lille, as a model for future development.

The aspiration to create new models for WaSH provision is driven by a crisis affecting millions of South Africans. There is strong demand for new approaches that support health, dignity, and functional sustainability. WaSH-UP is the CTPC's upgrading initiative built through collaborative projects over eight years, including in 2012 a strategic risk taken to build a facility aimed at changing the imagination about how communal facilities are built and operated. In contrast to untended, frequently dysfunctional toilets and taps, the WaSH-UP facility is an aesthetically pleasing place with space for social amenities and public health promotion. Another new facility under development with community labor and leadership will enhance environmental sustainability through waterless, urine-divergent toilets. The facilities are regularly toured by local and international urban development practitioners, activists, academics, and politicians, including (twice) the Premier of the Western Cape Province. Translating such interest and expressions of support into tangible policy change and resource flows is far from certain, however. While demonstrably more promising than existing approaches, major hurdles remain to sustainably operating the existing facilities, to say nothing of scaling up to meet huge national demand and achieve "system-level" impact.

As increasing numbers of educational institutions embrace project-based, community-engaged learning strategies, the academic "system" is slowly changing as well. Such programs can serve as models for engaging students and faculty meaningfully with local partners in sustainable development efforts that balance community and academic impacts at a range of scales. Prospects for systemic influence depend in no small part on understanding, documenting, and assessing such impacts.

Stoecker et al. (2010) argue the institutional infrastructure needed to support transformative work with communities "does not yet exist in higher education" and that a stronger commitment to assessing community impacts is a necessary predicate to getting there. While meaningful assessment will remain difficult both for academic institutions and community partners, the model described in this paper can provide a starting point for more intentional program design and assessment. Use of the model in anticipatory ways can highlight for all participants potential impacts at different scales. Even when evidence of impact is elusive, clear intentions regarding both academic and community impacts, from the individual to the systemic level, may increase the likelihood of positive outcomes for all.

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