2023 Annual Conference & Exposition
Baltimore Convention Center, MD | June 25 - 28, 2023

The Harbor of Engineering
Education for 130 Years

ASEE

Paper ID #38359

Community-University Relationships in Environmental Engineering Service-Learning Courses: Social Network Vectors and Modalities of Communication

Hannah Cooke, University of Connecticut

Hannah Cooke is a doctoral student in Curriculum and Instruction with a focus on Science Education at the University of Connecticut. Her research interests include critical, antiracist science teaching that works to dismantle systems of oppression. Currently, she is a research assistant on the DRK12 project COVID Connects Us: Nurturing Novice Teachers' Justice Science Teaching Identities, which uses design-based research to develop justice-centered ambitious science teaching practices with in-service science teachers. She also works on NSF projects that aim to improve equity in undergraduate STEM education, especially for students with LGBTQ+ identities. In addition, she is working in the Education Leadership department exploring student activism around issues of racial equity. Her former role as a high school science teacher and facilitator of the school's Green Team led her to grapple with the role science educators play in advancing environmental justice. She holds a MA in Curriculum and Instruction and a BS in Biological Sciences from the University of Connecticut.

Dr. Rebecca Campbell-Montalvo, University of Connecticut

Dr. Rebecca Campbell-Montalvo is a cultural anthropologist who focuses on understanding how a range of people (including women, historically excluded racial/ethnic groups, and LGBTQIA+ students) are served in undergraduate STEM contexts, with an emphasis on engineering and biology. She is a postdoctoral research associate in the Neag School of Education in the Department of Curriculum and Instruction at the University of Connecticut. In addition, Campbell-Montalvo is Co-PI on a $500,000 NSF grant that seeks to improve inclusion in biology education and biology education research through the Inclusive Environments and Metrics in Biology Education and Research network. Prior to her current role, Dr. Campbell-Montalvo was the Program Assistant for the National Institute of Health's Maximizing Access to Research Careers Undergraduate Student Training in Academic Research program in the Department of Chemical and Biomedical Engineering at the University of South Florida. Her new book, The Latinization of Indigenous Students, comes out spring 2023 with Lexington Books.

Todd Campbell, University of Connecticut
Chester Arnold
Dr. Maria Chrysochoou, University of Connecticut

Maria Chrysochoou is a Professor and Head of the Department of Civil and Environmental Engineering at the University of Connecticut.

Byung-Yeol Park, University of Connecticut
Peter C. Diplock

Community-University Relationships in Environmental Engineering Service-Learning Courses: Social Network Vectors and Modalities of Communication

Introduction

This work offers an initial and essential exploration of the ways in which universities and communities become connected in service-learning programs. Since numerous studies have found that service learning offers an array of benefits to undergraduate students [1], [2], it is equally important to consider perspectives of the partnering communities. Specifically, in some contexts, university-community partnerships, both generally and service-learning programs in particular, are exploitative due to the power imbalance caused by the "concentration of power and knowledge" of universities [3]. In this way, service learning can reify the very issues it seeks to address. Mitchell [4] distinguishes traditional service learning from critical service learning. One of the elements of critical service learning is authentic relationships between university and community stakeholders. Examining the network of service learning provides potential insight into these relationships and possible power imbalances.

Additionally, environmental education, like other fields of STEM education, often holds positivist ideals of truth, claiming objectivity and neutrality. STEM education, including environmental education, has supported the maintenance of inequality by prioritizing some truths over others. For instance, in environmental risk assessments, the experiences, project repercussions, and expertise of racialized and low-income people can be ignored or excluded [5]. This is particularly troubling given that racialized and economically disenfranchised people are often more affected by environmental hazards than other groups [6]–[8]. Again, here, examination into the social networks connecting communities and universities in such partnerships may inform analyses focusing on diverse community representation in such programming.

The goal of the service-learning program at focus, Project Local (anonym), is to benefit communities and educate students in environmental service-learning courses in three areas: brownfields, stormwater, and climate change [9], [21], [22], [23]. Often, and in the case of Project Local, people in local municipal government known as "community liaisons" serve as a linchpin to connect universities and communities. As suggested, ways to generally support equitable service learning could be through considering how university-community connections are made and sustained and expanding the types of communities served by such partnerships. We argue that understanding the perspectives of community liaisons is a first step to examining how beneficial and accessible such partnerships are.

Thus, the purpose of this exploratory study is to offer an approach to understand the mechanisms through which community liaisons come to engage with Project Local and the outcomes they experience. This work helps establish a process of inquiry building (i.e., method of study) as well as a glimpse at the phenomenon by measuring and examining the characteristics of university and community social network actors that support their connection to the university-community partnership, as well as the processes through which they become connected. There has not been prior study of the web of relationships connecting local communities to Project Local, and literature on such processes connecting universities and communities through a social network analysis lens is sparse. The research questions driving our work include:

1. What are the characteristics of the community liaisons who partnered in Project Local?

2. Through what relationships have community liaisons come to be a part of Project Local projects?
3. What modes have university stakeholders used to connect with communities?
4. What were the outcomes of the Project Local student projects from the perspective of the community liaisons?

In this paper, we provide an overview of Project Local, summarize relevant literature, describe our methods and findings, and end with implications for practitioners and researchers.

Context: Project Local

For the Project Local curricula, students enroll in a semester-long course in one of the three environmental foci, which is followed by a second semester in which individual students or small teams are connected with a community to assist in addressing a specific need related to that discipline [9], [21], [22], [23]. The three courses include: Climate Corps, which focuses on mitigation and adaptation policies; Brownfields Corps, which explores remediation and redevelopment of contaminated sites; and Stormwater Corps, which addresses issues of stormwater management. Each of these courses is meant to assist towns and organizations in a tailored manner with their respective environmental challenges. Many small municipalities or community organizations lack the time, expertise, or financial resources to tackle environmental issues on their own; students, with the guidance of their instructors, help fill that capacity gap [9]–[11]. Project Local students are generally either educated in the skills of consultants, wherein they help communities plan projects that the communities had already defined (or they help them define), or the students do the bulk of the work in gathering information and drafting grant proposals, such as those for the EPA (Environmental Protection Agency).

Relevant literature

Land Grant universities have a duty to serve their communities [12], and university-community partnerships provide a range of opportunities for various stakeholders - students, instructors, and community members - to serve communities generally. Service learning is one approach where students earn course credit, learn real-world skills, and apply those skills in context while benefitting communities [13]. Benefits to students have been documented in a variety of fields including education and STEM [1], [2]. Yet more research is needed to explore the community perspectives in service-learning partnerships, especially considering the potentially problematic power dynamics at work [3], [4], [14]–[16]—an area ripe for investigation that we explore. Additionally, as our work does, it is important to understand the way in which communities are recruited and brought into service-learning partnerships, including whether some communities are prioritized over others, or whether some communities are avoided altogether.

Environmental issues, like sea level rise, pollution from brownfields, or flooding from stormwater, rarely remain within the borders of a town or state. Despite the existence of federal and state policies requiring the address of issues, towns and states are largely left to work on these large-scale issues on their own, often without any federal or state financial support [10]. Municipal leaders want to address environmental issues for a variety of reasons (e.g., residents' concerns, health and safety, increasing the amount of taxable property), but they often lack the time, budget, and specific skills to do so [11].

University-community partnerships, like service learning, can fill these capacity gaps. Using their skills and expertise, university instructors can facilitate relationships between towns

and their students. Students then learn real-world professional skills and apply their knowledge of environmental issues to the community context. The community partner shares their insider knowledge of the town and the priorities of its residents. The potential of these real-world benefits makes exploration into such partnerships a paramount concern for STEM education and environmental sustainability researchers alike.

Theoretical Framework

For this study, we draw on the theory of social capital [17],[19]. Social capital can include the network of relationships with influential people and access to useful resources that a person may have. Service learning draws on synergies between the social capital of the people involved (see [17]). The specific form of social capital that we focus on is informed by social network theory. Importantly, it is known that individuals often associate with people in similar social positions, such as same race/ethnicity, socioeconomic status, and gender [18]. This homophily of relationships can inadvertently exclude people who occupy marginalized social positions, possibly particularly those most affected by environmental issues due to social structure and social forces outside of their control (e.g., redlining). In order to undertake this research and understand and model the connections at play, we use social network theory. Findings may support the broadening of the benefits of environmental sustainability service-learning university-community partnerships to areas that may be underserved.

Our specific aim is to begin to understand the network characteristics of actors in the Project Local university-community partnership, in this case, the extent to which the networks bridging the service-learning partnerships might be homophilous. We also considered the relationships and modes of communication the three courses use to connect with liaisons, since those can affect the range of community liaisons expressing interest in the program. We finally sought to explore the potential benefits that communities might experience as a result of these social network configurations.

Methods

Data Collection. This exploratory study used a mixed methods approach to address its research questions. Twelve of the thirty community liaisons who had helped contribute to the previous ~100 student projects completed the survey using our university IRB-approved procedures. Liaisons were invited to take the survey via email sent from a Project Local instructor or the study's project manager. The survey was an adaptation of Lin's [19] position generator instrument wherein respondents were asked about their ties to people in identified social positions (e.g., professor, STEM professional, municipal employee). The survey included items about the relationships and specific steps taken through which liaisons accessed information about how to join Project Local and included questions about student project outcomes. Participants listed up to five people who connected them to the program and were asked to identify their gender, race/ethnicity, and socioeconomic status. Perceptions of others' demographic characteristics is of course a flawed method, but still useful in estimations of network homophily [17]. The survey also asked for respondents' demographic information. Lastly, the survey inquired whether respondents were interested in a follow-up interview. Two participants were interviewed by the first author for 40 to 50 minutes using a semi-structured interview guide. Probes and follow-up questions were also employed for additional details and specific examples.

Data Analysis. Descriptive statistics were employed on the closed ended items of the survey to describe the characteristics of the liaison sample. Responses to open-ended survey items and the interview questions were thematically analyzed using a codebook constructed by considering the research questions, relevant literature, survey items, and data itself [20]. Analysis of the survey and interview data showed the characteristics of the network, the relationships and modes through which liaisons became involved, and the outcomes of the students' projects.

We also used the survey data to map the social networks through a sociogram. Specifically, we mapped the survey respondents' answers to the item asking them to name who helped them become connected to Project Local. We used the software program R to construct a sociogram by entering in each person taking the survey as a source, and the people and organizations they explicitly identified in the items specifically asking about how they became connected them as targets. We also analyzed respondents' answers on other items, such as the open-ended items about the process they went through to become connected to Project Local, to ascertain any additional people and organizations that should be listed as additional targets. For example, Liaison 3 wrote that University Staff 3 "was introduced to me by [Project Local Instructor 5]." In this case, the instructor was added as a source and the staff member as his target.

Results

Social network composition: homophilous and dense. To address Research Question 1 (RQ1), the data offer a firsthand look at who is in the Project Local network. Of the twelve survey respondents, six were from the climate course, four the brownfields course, and two had participated in both the brownfields and the stormwater courses. Eleven respondents were white, and one listed 'other' as their race/ethnicity. Eight respondents were women and four men. For household income, six made less than $100,000 (with one below $50,000) and six made above $100,000 (with four of those above $250,000). The participants held a wide variety of job titles, from a volunteer for a Land Trust to Climate Adaptation Specialist, but most were town employees. Thus, the sample was generally similar to the Project Local faculty in terms of racial and gender homophily, as Project Local faculty were also predominantly white with about half being women. It also contained a spread of incomes with overrepresentation in those from higher socioeconomic backgrounds. Additionally, most participants estimated that the people who connected them to Project Local had a similar household income to them.

Regarding RQ2, survey data showed how communities liaisons became a part of Project Local, revealing that respondents' social networks were dense—that is, they tended to connect to multiple other liaisons, university employees, or other environmental actors who supported connections between the university-community partnership (who often knew each other). Project Local is a collaboration between several departments and colleges at the university, including the School of Engineering, the Department of Extension, and the Center for Land Use Education and Research (CLEAR)—actors from these range of organizations were seen in the networks reported in the survey. A local land trust was a significant node in the social networks of survey respondents—for instance, the brownfields' instructors, an employee from the state's Department of Energy and Environmental Protection, and an employee from the state's Department of Economic and Community Development all participated in it.

Providing further nuance, interview data shed light on how these social network nexuses may have influenced the decision of participants to enter into the university-community partnership. One participant, a community liaison from the Climate Corps, explained that his

decision to bring his town into a partnership with Project Local was spurred initially from an email he received from a listserv managed by the university's Department of Extension, and that his knowledge of several other actors' participation sealed the deal. He shared, "Project Local is basically run, I think, out of the Center for Land use Education And Research, which is the department [of one of the Project Local instructors]. Its [listserv and emails] have become a de facto communication tool for planning and zoning professionals." While he noted that he could not speak much about the connections between the organizations beyond his purview, he did know that multiple university offices and departments were involved, and he knew one of the instructors was involved in at least one of the departments. The existing collaboration combined with a professional relationship he had with the instructor increased his interest in Project Local.

Additionally, the Brownfields Corps is part of Project Local and is also housed in a statewide brownfields initiative located at the university. Because brownfield remediation requires engineering, land use regulations, economic development and environmental assessments, several municipal and state departments work together.

Sociogram. In concert with our broader interest in the social location of actors that is paramount in social network analysis, we were less focused on the individual/organizational actors themselves, and more interested in their social locations and how they connected actors to Project Local. Outside of Project Local and the University generally as well as Students, and other non-human/non-organization connections (i.e., Conferences, Publications) as nodes, we identified 9 discrete actor/organization-types that we map to show how Liaisons became connected to Project Local. These include the 1) Liaisons themselves, followed by 2) University Programs (e.g., Extension), 3) Project Local Instructors, 4) (other) University Staff, 5) Government Employees (e.g., Town Grant Writer), 6) State Organizations (e.g., DEEP), 7) State/University Partnerships (e.g., Brownfields Initiative), 8) External Organizations (e.g., Conservancies), and 9) External Organization Employees. For simplicity, we can think of these nine types as involving the people and programs at the *university*, people and programs associated with town, state, and federal *government*, and then external *organizations* and their employees.

As the sociogram shows (Figure 1), there was much density (nodes could know each other) and nodes often had multiple connections to Project Local. Some nodes were more embedded within the mapped network, such as Liaison 8 and Project Local Instructor 2, than others. Importantly, a clear web of extensive ties emerges from viewing the sociogram, showing the numerous ways that the community liaisons are connected to actors and programs related to Project Local.
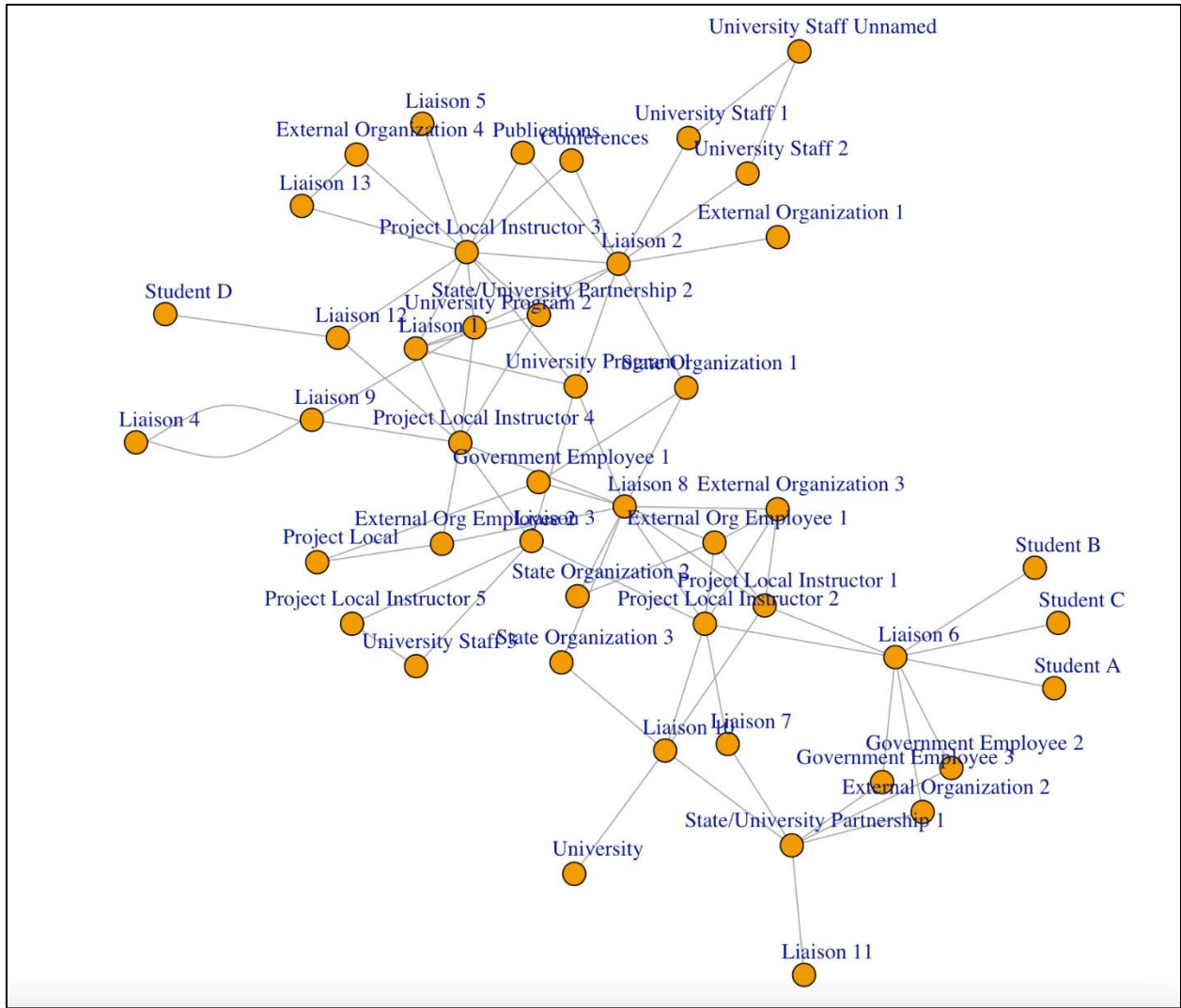
Figure 1. Sociogram of Participant Survey Responses on Connection to Project Local

Mode of connection: varied and supported by pre-existing relationships. When it comes to RQ3, importantly, each Project Local course uses different approaches to identify potential partnering communities. Five of 12 participants heard about Project Local through individual invitation based on established working relationships with an instructor. For example, one respondent wrote that that they:

> Had numerous opportunities to work on projects with [the climate course instructor] through my volunteer work with [a local] land conservancy. As opportunities arose, [the instructor] suggested student projects that would fit a larger project we were already working on, or the opportunity to continue a previous project.

This respondent indicated that they were connected to the university and to one climate course professor in numerous ways. Having the instructor suggest projects was one way Project Local was made accessible. Another liaison wrote, "[My local town] has worked with [the] Professor [of the brownfields course] on other projects. We also receive email notifications from the university and the Department of Economics and Community development." This illustrates that both the climate course and brownfields course maintain relationships with communities,

building upon their past professional relationships to find community partners—relationships and connections supported through electronic communication.

However, in contrast to the more informal, word-of-mouth recruitment of the climate course, the brownfields course also sends out a request for proposals, requiring potential liaisons to fill out an application. One participant described this process, "I wrote a proposal to the brownfields program after calling the faculty member involved to talk about what it offered. Unbeknownst to me as co-coordinator of the 30-member 2021 [local environmental] certification team, our town's grant writer and compliance officer was writing one simultaneously." Another brownfields liaison wrote that they found out about Project Local "through an advertisement for brownfields and contacting [one of the professors]." Multiple respondents mentioned that they reached out to the instructors to ensure the program could fulfill their towns' needs. So, in cases where the initial connection was made absent pre-existing relationships, both community and university actors connected to form a relationship and discuss the proposal process and opportunity further.

In addition, community partners found out about the program through other university programs (Sea Grant program, Extension department, etc.), emails and advertisements, and a variety of other places (e.g., from the state department of environmental protection, town consultant). Of the robust efforts of the brownfields course, one of the interviewees shared, "I have a feeling the brownfield call was more aggressively promoted than the others. Even now, I think even the emails now, there's definitely a lot more follow-up." Another respondent shared, "I received an email from [the climate course's extension professor] explaining the program and how municipalities could get involved. I believe it was posted on the [state] planners' listserv (hosted by [the university's] extension)." This more formal promotion via email may enable the brownfields program to reach people who are not personally connected to the university.

We draw special attention to how the power of the social network was seen when the recruitment efforts from list servs and other advertisements were *compounded* with the instructors' pre-existing ties. For instance, the second interviewee stated the following:

> I knew [the climate corps instructor] a little bit. I've been a planner in [the state] for 20 years or so and [the instructor]…, he's been around longer than that… but we've traveled in the same planning circles. Then [the instructor] and I had more contact when he took over at [the university]…and then raised his profile and his job became interfacing with local planners, particularly in smaller towns and that's primarily who I work with. It's a small state, it's a relatively limited profession, so we cross paths…[The instructor's] name being attached to it made it much easier to click the link or whatever, or to reach out. Just because again, if it's someone I didn't know or who was a new program initiated by a new person or a new department that I had no familiarity with, chances are probably still would've reached out because I'm always trying to find these opportunities for towns, particularly free opportunities for towns. But [the instructor's] name being attached to it as a program that he was involved with, that he endorsed, that he promoted made it a very, very easy decision.

The participant described how he had a pre-existing relationship with a climate corps instructor, so when Project Local was shared with the interviewee via the list serv and the liaison saw the instructor's name, they were drawn to learn more about it.

The second interviewee, the Environmental Planner for a local town, held a relatively new position, and reported frustration at her office's lack of budget. For her, Project Local offered additional support that she could use to support sustainability initiatives, even though she

had not had previous connections with the partnership. She reached out to Project Local after hearing about it during a webinar that took place during the early months of the pandemic. She explained how Project Local offered powerful opportunities to form important connections to get the work done given her capacity gap caused by money issues:

> There were a whole series of CLEAR webinars that gave me sanity. I was trying to figure out my job with absolutely nothing to base it on because I started 10 days before it shut down [due to the pandemic]. There was nobody I was succeeding from—the person before me had left several months earlier—so I went into [the position] working from home… If we don't get the grant [from the Project Local student project], it's going to be disappointing… That's where it's difficult for lonely souls like me to just pick myself up, dust myself up and move on to the next thing. I think that to have an ongoing relationship with [Project Local] after the fact would really help people like me. I don't think I'm the only one who feels really alone in government in doing their work.

The potential outcomes of her relationship with Project Local were apparent, but her efforts also involved some calculated risk. If the student project did not yield a grant, it could be a setback for her. It appears that she would have been open to further sustained interactions with Project Local to help build her social network as well.

Community outcomes. In addition to sharing how they became involved with Project Local, participants shared their experiences on the outcomes of the student projects, addressing RQ4. Specifically, they described how the climate course students contributed to resiliency plans, updated the state homeowner's handbook to prepare for natural disasters, and recommended mitigation strategies for forest health. Brownfields students provided inventories and assessments, drafted grant applications, and explored options for redevelopment. Several of the student projects were being used to apply for funding or to get projects started. One town was awarded $650,000 from the Environmental Protection Agency based upon the proposal generated by Project Local students. In addition, students recommended 16 stormwater management practices on municipal property and one town was looking to get funding to implement those suggestions. Further, the data revealed that liaisons participated in Project Local to provide students an opportunity for applied learning and to obtain high quality expertise and assistance for town projects at no cost to the town. Overall, liaisons shared positive comments about how their communities benefitted from Project Local programming.

Discussion

From this exploratory data, we found that the people and organizations in the university-community Project Local partnerships were generally similar and highly connected to each other across multiple nodes, but electronic communication supported these and new network intersections. In addition, the data illustrated capacity gaps and how Project Local filled them.

The overlapping relationships between university entities, such as CLEAR, the Department of Extension, and Sea Grant, as well as the relationships between the university entities with communities both ensured a tight knit community among town planners. Several community liaisons knew instructors through multiple programs associated with the university. In addition, the state brownfields initiative has interconnected priorities of remediating pollution and redeveloping properties. This requires multiple people and organizations at the federal (EPA grants), state (Department of Energy and Environmental Protection), and municipal levels (town planners and engineers). For several liaisons, the overlapping relationships provided a close-knit

community, one potentially well-suited to buttressing the documented economic shortfalls through grants and other mechanisms.

Mitchell (2008) claims that authentic relationships are one element distinguishing critical service learning from traditional service-learning approaches. Genuine partnership between community liaisons and university staff and students is essential for effective and sustainable service learning. More broadly, while the data suggests that genuine relationships exist in Project Local's network, we note that critical attention is needed in the overall aims of community engagement models like Project Local. Specifically, we note that Mitchell [4] emphasizes explicitly naming and deconstructing the very systems that have led to capacity gaps at the municipal level to help support social change in service of environmental justice. This is particularly the case as marginalized people may cause the least environmental damage, bear the brunt of the effects, and tend to be excluded from the jobs, roles, and connections through which beneficial environmental engineering outcomes from university-community might be actualized.

Conclusion

This exploratory study gives insight into the network of relationships and mechanisms through which community liaisons connected with the Project Local program as well as the outcomes local communities experienced. Indeed, the results presented may serve as a starting point of a model to evaluate the equity of the program's community engagement (or the engagement of similar programs). As there was high racial and gender homophily with participants, and that homophily extended from nearly all white composition of the faculty and participants, we suggest that Project Local consider diversifying its team and its outreach mechanisms and build authentic, reciprocal relationships with communities that they have so far not yet reached. At the same time, we recognize Project Local's strength in including many women faculty and community liaisons. Currently drawing from a likely higher socioeconomic background of liaisons, we suggest that Project Local may expand the pool of areas it reaches with modified recruitment procedures to build upon their already robust practices, wherein they may work with more "grass roots" or local community members who might not reside in such high economic classes and likely experience the environmental concerns as a more central component of their day-to-day living.

A key contribution of this study lies in its design. This exploratory yet robust analysis across survey items enabled triangulation to help us reconstruct the networks to identify the multiple points of connection that wedded the liaisons to Project Local. This is useful since it informs on the multiple layers and points through which network members are connected to support the flow of information resources to connect a range of people to Project Local through a variety of roles and organizations. By using multiple survey items in our analysis, we are able to offer a more sophisticated map that better reflects the complex array of nodes through which valuable resources like E-Corps become accessible to communities. Then, our interpretation of qualitative items informed on the specific ways the flow of information worked through the networks. This offers an informed point of departure for other, more sophisticated analyses to map the complex array through which people come to take part in consequential resources, including environmental remediation programming available through Project Local.

A limitation on interpretation, the composition of the sample does not necessarily mean that the communities participating liaisons represent are predominantly white; however, it could indicate that town employees and environmental professionals are predominantly white—or at least those completing the survey. Outside the purview of Project Local, this information and

other evidence shows a need for greater inclusion of a range of people in town government. Importantly, the sample surveyed indicated mostly positive outcomes from the student projects. Because of these results and that social groups can tend to be homophilous, expanding outside of Project Local's reliance on personal and professional connections may help disrupt environmental injustice by helping a larger range of communities to take advantage of its programming. The results of this exploratory study offer next steps for university-community partnerships and service learning research and practice.

References

[1] J. Botelho, "Uncovering the quality of STEM service-learning course implementation and essential elements across the California State University system," *Mich. J. Community Serv. Learn.*, vol. 26, no. 2, Sep. 2020, doi: 10.3998/mjcsloa.3239521.0026.201.

[2] M. Salam, D. N. Awang Iskandar, D. H. A. Ibrahim, and M. S. Farooq, "Service learning in higher education: A systematic literature review," *Asia Pac. Educ. Rev.*, vol. 20, no. 4, pp. 573–593, Dec. 2019, doi: 10.1007/s12564-019-09580-6.

[3] S. E. Dempsey, "Critiquing community engagement," *Manag. Commun. Q.*, vol. 24, no. 3, pp. 359–390, 2010, doi: 10.1177/0893318909352247.

[4] T. D. Mitchell, "Traditional vs. Critical Service-Learning: Engaging the Literature to Differentiate Two Models," *Mich. J. Community Serv. Learn.*, vol. 14, no. 2, pp. 50–65, 2008.

[5] M. Checker, "'But I Know It's True': Environmental Risk Assessment, Justice, and Anthropology," *Hum. Organ.*, vol. 66, no. 2, pp. 112–124, Jun. 2007, doi: 10.17730/humo.66.2.1582262175731728.

[6] R. Holifield, "Environmental Justice as Recognition and Participation in Risk Assessment: Negotiating and Translating Health Risk at a Superfund Site in Indian Country," *Ann. Assoc. Am. Geogr.*, vol. 102, no. 3, pp. 591–613, May 2012, doi: 10.1080/00045608.2011.641892.

[7] M. Singer, "Down Cancer Alley: The Lived Experience of Health and Environmental Suffering in Louisiana's Chemical Corridor: Experience of Health and Environmental Suffering," *Med. Anthropol. Q.*, vol. 25, no. 2, pp. 141–163, Jun. 2011, doi: 10.1111/j.1548-1387.2011.01154.x.

[8] B. Tilt, "Industrial Pollution and Environmental Health in Rural China: Risk, Uncertainty and Individualization," *China Q.*, vol. 214, pp. 283–301, Jun. 2013, doi: 10.1017/S0305741013000350.

[9] C. Arnold, J. Barrett, T. Campbell, M. Chrysochoou, and N. Bompoti, "The Environment Corps: Combining classroom instruction, service-learning, and extension outreach to create a new model of community engaged scholarship at the University of Connecticut," *J. High. Educ. Outreach Engagem.*, vol. 25, no. 2, p. 17, 2021.

[10] M. A. Boyer, "Global climate change and local action: understanding the Connecticut policy trajectory," *Int. Stud. Perspect.*, vol. 14, no. 1, pp. 79–107, Feb. 2013, doi: 10.1111/j.1528-3585.2012.00480.x.

[11] B. Hyde and J. Barrett, "Municipal issues and needs for addressing climate adaptation in Connecticut," University of Connecticut College of Agriculture, Health and Natural Resources, 2017. [Online]. Available: https://clear.uconn.edu/publications/

[12] Kellogg Commission, "Returning to Our Roots: The Engaged Institution. Third Report," National Association of State Universities and Land Grant Colleges, Washington, DC, RIE, Feb. 1999. Accessed: Jul. 07, 2022. [Online]. Available: https://eric.ed.gov/?id=ED426676

[13] R. G. Bringle and J. A. Hatcher, "Implementing service learning in higher education," *J. High. Educ.*, vol. 67, no. 2, p. 221, Mar. 1996, doi: 10.2307/2943981.

[14] D. D. Blouin and E. M. Perry, "Whom does service learning really serve? Community-based organizations' perspectives on service learning," *Teach. Sociol.*, vol. 37, no. 2, pp. 120–135, Apr. 2009, doi: 10.1177/0092055X0903700201.

[15] K. Bortolin, "Serving ourselves: how the discourse on community engagement privileges the university over the community," *Mich. J. Community Serv. Learn.*, vol. 18, no. 1, pp. 49–59, Sep. 2011.

[16] H. Gibson, J. Canfield, and A. Beamish, "Understanding Community Perceptions of Service-Learning," *J. Serv.-Learn. High. Educ.*, vol. 11, pp. 5–20, 2020.

[17] J. Skvoretz *et al.*, "Pursuing an engineering major: social capital of women and underrepresented minorities," *Stud. High. Educ.*, vol. 45, no. 3, pp. 592–607, Mar. 2020, doi: 10.1080/03075079.2019.1609923.

[18] M. McPherson, L. Smith-Lovin, and J. M. Cook, "Birds of a Feather: Homophily in Social Networks," *Annu. Rev. Sociol.*, vol. 27, no. 1, pp. 415–444, 2001, doi: 10.1146/annurev.soc.27.1.415.

[19] N. Lin, *Social capital: a theory of social structure and action*. Cambridge, UK ; New York: Cambridge University Press, 2001.

[20] V. Braun and V. Clarke, "Using thematic analysis in psychology," *Qual. Res. Psychol.*, vol. 3, no. 2, pp. 77–101, Jan. 2006, doi: 10.1191/1478088706qp063oa.

[21] B.-Y. Park *et al.* "The development of high leverage practices in environmental sustainability-focused service learning courses: applications for higher education." *Env. Ed. Res.*, vol. 28, no. 11, pp. 1635-1655, 2022, doi: 10.1080/13504622.2022.2070603.

[22] R. Campbell-Montalvo *et al.* "E-Corps' Implementation of Environmental Sustainability-Focused Service-Learning: Conditions Supporting the Establishment of an Epistemic Community." *J. STEM Out.*, vol. 4, no.1, pp. 1-12, 2021, doi: 10.15695/jstem/v4i1.12.

[23] B.-Y. Park *et al.* "Applied Environmental Teaching using Caring Pedagogy is Essential in Educational Disruptions," *Res. Iss. Cont. Ed.*, forthcoming.