# Workshop: Integrating Community-Engaged Learning into First-Year and Pre-College Programs


## Abstract

Community-engaged learning or service learning integrates academic learning with service activities and partnerships with local or global communities. It provides a learning environment that is very well-matched with accreditation standars across many outcomes as students can learn strong technical skills while also developing professional skills. Evidence suggests that community-engaged learning has the potential to increase participation among underrepresented populations within engineering. Evidence also shows that participants increase motivation to stay in engineering offering exciting opportunties for first-year programs. There are however many challenges integrating real community engagement into the classroom including meeting learning outcomes and partner needs. This interactive workshop will provide an introduction to community engaged leanring and use a recently developed model to explore approaches that seek to balance value to students and communities as well as resources that are needed from each. Resources, partnerships, benefits and potential barriers will be discussed to provide strategies for successful implementation at the participants' own institutions. The presenter is experienced in the field and has conducted more than 100 faculty workshops on the subject area.


## Introduction

Engineering education is experiencing pressure to accommodate increasing technical knowledge as well as the broad set of professional skills needed to succeed in today's global economy. Efficient, high impact approaches are needed to create efficiencies in the curriculum. Experiential learning is one approach that allows students to develop disciplinary and professional skills and can help students transition into professional practice more effectively.

Community-engaged learning is a form of experiential education that brings the added benefits of impact to the broader community. Community-engaged learning, also called service-learning, integrates work within an underserved area of society with academic content. Needs within the local or global community are addressed by learning and applying academic content within a course or program. The five components of the pedagogy are [1]

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1. Engagement opportunities that meet the needs of an underserved segment of society
2. Academic connection between the engagement and the subject material of a course.
3. Reciprocal partnerships where all benefit from the collaboration.
4. Mutual learning among all stakeholders, built on a foundation of respect.
5. Reflection on the experiences and its implications for the future.

Research has shown many benefits for students across many disciplines [2-6]. Within engineering, evidence shows learning across a broad set of profession and technical skills [7-11]. Graduates report easier transition into professional practice and faster advancement in industry positions [12]. The pedagogy can increase retention [13-15] and improve diversity within the engineering cohort [16-17]. Community-engaged learning also provides real impact on

underserved communities. Partnerships are created with non-profits or NGO's, community organizations, or governmental agencies to address needs within the local or global community. Partnerships offer a way to leverage the capacity we have in our colleges and universities to address needs of the underserved and make a difference in the world.

While engineering has been slower to adopt the pedagogy than other disciplines, there are many successful examples. Because community-engaged learning is part of the curriculum it is unique to a degree at each institution. The curriculum, faculty, administration, students, and community partners are different. The pedagogy can be used to meet many different learning outcomes which need to be defined by local faculty. The scope of the engagement effort can range from large programs such as the SLICE program at the University of Massachusetts-Lowell [18] or Purdue University's EPICS Program [19]. Successes include programs that engage first-year engineering students in diverse project experiences and partnerships [13,14,17]

*Models for Engagement*

Models have been developed to conceptualize and evaluate community-engaged learning and service-learning that have served as useful tools.. These include an approach for examining the balance and linkage of the words service and learning by Sigmon [20].

**TABLE I A Service and Learning Typology**

| | |
|---|---|
| service-LEARNING | Learning goals are primary; service outcomes are secondary |
| SERVICE-learning | Service outcomes are primary; learning goals are secondary |
| service learning | Service and learning goals are separate |
| SERVICE-LEARNING | Service and learning goals have equal weight; each enhances the other for all participants |

Stanton, Giles and Cruz developed a triangular model that explores and maps the diverse focus areas of many pioneers of service-learning along axes connecting the concepts of service, education, and democracy [21].

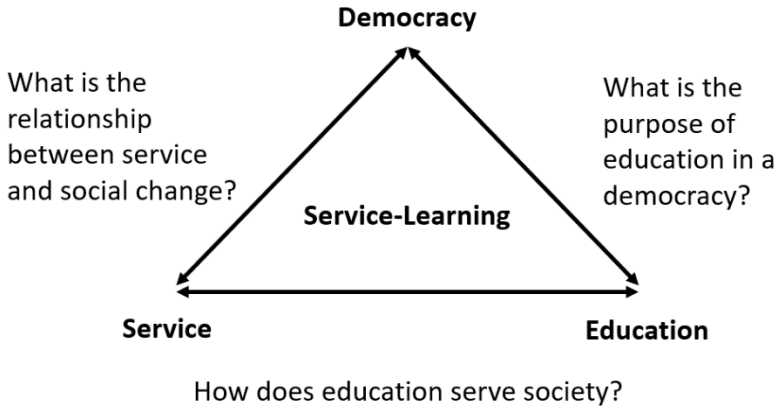


**Figure 1 Service-Learning Model**

A widely used model for exploring programmatic approaches is the Furco Continuum to explore the balancing of learning and service as well as the focus on the recipient within the community and providers from the institution [22].

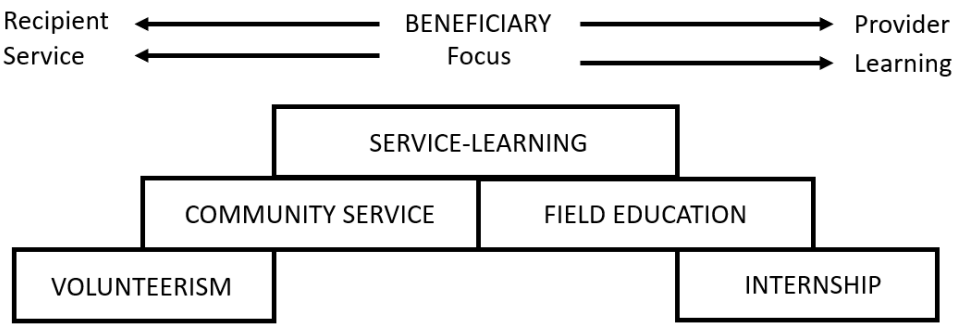


**Figure 2 Furco's Distinctions Among Service Programs**

While prior models have served areas of the service-learning and community engagement space well over the past decades, they are often difficult to use for engineering. Much of the work outside of engineering is placement-based engagement where student spend time within a community or community organization. In engineering the engagement is often project-based where the value to the partner is the result of a design and much of the time spent by student participants is working on the project.

The conceptual difference of project-based engagement is not that it simply replaces the place-based experience with a project. It creates two realms of engagement. One if the project or deliverable itself where the students and community partner interact to create a solution to the mutually identified need. The second realm is the process by which the project is developed. Both the project process and the project deliverable generate, enhance, and redistribute value based on input of resources from stakeholders. The relationships, time, and activities that contribute to the project process can add value to many of the stakeholders by building awareness in the participants, developing connections, and helping the partners achieve their missions.[23]

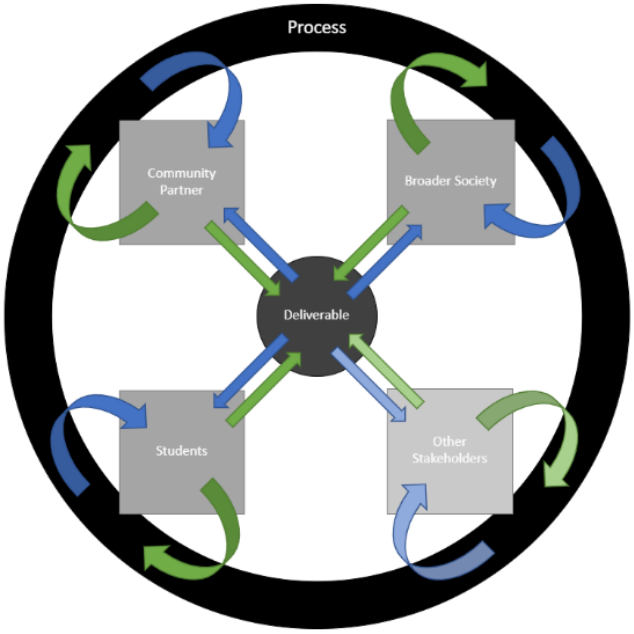


**Figure 3 Project-Based Community Engagement Model [23]**

The model shown in Figure 23 places the deliverable in the middle not to signify more value on the deliverable but in recognition that in many engineering design or project experiences this is

made to be the main focus. The model acknowledges the importance of the completed project while also expanding the user's view outward to include the process elements. The outer circle represents the project process, which binds the stakeholders together. A goal of any kind of community engagement is to create reciprocal partnerships where each partner is respected, brings expertise, and resources and receives value from the partnership. The process creates a shared relationship in the experience and connects the stakeholders. The process includes everything that happens during the experiences, activities, and partnership. The boxes representing the stakeholders inside the circle are those that are explicitly included in the partnerships. Three common stakeholders are listed in the circle but can be edited or added to represent those involved in the program or project. The arrows moving away from the stakeholders represent resources contributed by that stakeholder. The arrows moving into the stakeholder boxes represent value received by that stakeholder. The arrows between stakeholders and project process are shown as more circular because of the continuous give and take from the process. The arrows to and from the project deliverable are shown as straight lines because these are more transactional and have direct connections in a particular direction. [23]

**Goals and Overview**

The goals of the workshop are to

1) introduce participants to the pedagogy of community engagement and service-learning and
2) explore they it could be integrated into their own courses, first-year curriculum our pre-college programs.

This workshop will guide participants through an introduction to the pedagogy and engage them in active discussions about how engaged learning can be integrated into their first-year programs. Participants will explore and discuss how to integrate the pedagogy into their own classes. Resources, partnerships and potential barriers will be discussed to provide strategies for successful implementation. Participants will be provided additional resources for further support beyond the workshop including examples forms, references and research findings.

The facilitator has conducted more than 100 workshops on six continents and are experienced in working with a diverse community of current and future educators and administrators. He has worked in First-Year Engineering programs for 25 years and is recognized internationally for his work in community engagement. His professional development activities has been recognized at conferences with two Frontiers in Education Conference Helen Plants awards for the best non-traditional session..

The agenda is shown below and includes short presentations of content, small group discussions and individual reflections.

**Table 2 Agenda**

| Agenda topics | Minutes |
|---|---|
| • Introduction to the workshop, agenda and format | 5 |
| • Overview of Community-Engaged Learning | 15 |
| ○ Key characteristics and essential elements | |
| • Successful models | 10 |
| ○ Which fits my own course | |
| • Getting started, what are the first steps | 10 |
| ○ How would I start in my own course(s) | |
| • Community partners | 10 |
| ○ Finding partners | |
| ○ Reciprocal partnerships | |
| • Reflection | 10 |
| ○ Models to use | |
| • Assessing student learning and experience | 10 |
| ○ Models to assess | |
| • Tools and resources | 5 |
| • Questions and discussions | 10 |
| • Workshop evaluation | 5 |

## References


[1] M. Lima & W. Oakes. *Service Learning: Engineering in Your Community* 2nd ed.,Oxford Press, 2014

[2] Eyler, Janet, "Reflection: Linking Service and Learning—Linking Students and Communities", Journal of Social Issues, Vol. 58 Issue 3, 2000, Pages 517 – 534

[3] D. E. Giles, & J. Eyler, The impact of a college community service laboratory on students' personal, social, and cognitive outcomes. *Journal of Adolescence*, *17*, 1994, pp. 327–339.

[4] Eyler, J., & Giles, D.E. (1999). *Where's the learning in service-learning?* San Fransisco: Jossey-Bass.

[5] A. W. Astin, L. J. Sax & J. Avalos, J. Long-term effects of volunteerism during the undergraduate years. *Review of Higher Education, 22*(2), 1999, pp. 187–202.

[6] A. Furco, et al. "Modeling the influence of service-learning on academic and sociocultural gains: Findings from a multi-institutional study." *Civic engagement and community service at research universities*. Palgrave Macmillan, London, 2016. 143-163.

[7] B. Jaeger, & E. LaRochelle, E.. $EWB^2$ – Engineers Without Borders: Educationally, a world of benefits. *American Society for Engineering Education (ASEE) Annual Conference Proceedings*, Paper AC 2009-740,,

[8] E. J. Coyle, L.H., Jamieson, W. C., Oakes, "EPICS: Engineering Projects in Community Service", *International Journal of Engineering Education* Vol 21, No. 1, Feb. 2005, pp. 139-150.

[9] A. R. Bielefeldt, K. Paterson, C. Swan Measuring the value added from service learning in project-based engineering education. *International Journal of Engineering Education, 26*(3), 2010, pp. 535-546.

[10] O. Pierrakos, R. Nagel, E. Pappas, J. Nagel, T. Moran, E. Barrella, E., et al. . A mixedmethods study of cognitive and affective learning during a sophomore design problembased service learning experience. International Journal for Service Learning in Engineering, Special Edition(Fall), 2013, pp. 1-28.

[11] K. Litchfield, A. Javernick-Will, and A. Maul. "Technical and professional skills of engineers involved and not involved in engineering service." *Journal of Engineering Education* 105.1, 2016, pp. 70-92.

[12] J. L. Huff, C. B. Zoltowski, and W. C. Oakes, "Preparing Engineers for the Workplace through Service Learning: Perceptions of EPICS Alumni", ", *Journal of Engineering Education*, Vol. 105, No. 1, January 2015, pp. 43-69

[13] L. Piket-May, and J. Avery, Service-learning First Year Design Retention Results, *ASEE/IEEE Frontiers in Education Conference*. October 10-13, 2001, Reno, NV.

[14] B. Ropers-huilman. , Carwile, L., and Lima, M. "Service-learning in engineering: a valuable pedagogy for meeting learning objectives", *European Journal of Engineering Education*, Vol. 30, No. 2 , pages 155 - 165

[15] W. Oakes, C. B. Zoltowski, J. Huff. "Impact of the EPICS Model for Community-Engaged Learning and Design Education." *International Journal Of Engineering Education* 34.2 (2018): 734-745.

[16] H.M. Matusovich, W. Oakes, C. B. Zoltowski, Why women choose service-learning: Seeking and finding engineering-related experiences. International Journal of Engineering Education, Vol. 29, No. 2, 2013, pp. 388-402.

[17] W. C. Oakes, M. C. Hsu, C. B., Zoltowski, Insights From A First-Year Learning Community To Achieve Gender Balance, *Proceedings of the 2015 Frontiers in Education Conference,* El Paso, Texas, October 2015.

[18] J. Duffy, L. Barrington, C. West, M. Heredia & C. Barry, "Service-learning integrated throughout a college of engineering (SLICE)". *Advances in Engineering Education*. 2, 2010.

[19] C. B Zoltowski, and Oakes, W.C., "Learning by Doing: Reflections of the EPICS Program", Special Issue: University Engineering Programs That Impact Communities: Critical Analyses and Reflection, International Journal for Service-Learning in Engineering, 2014, pp. 1-32.

[20] R. Sigmon, "The Problem of Definition in Service-Learning," In Sigmon et al., *The Journey of Service-Learning* (Council of Independent Colleges, 1996)

[21] Andrew Furco, "Service-Learning: A Balanced Approach to Experiential Education," In B. Taylor and Corporation for National Service (Eds.), *Expanding boundaries: Serving and learning* (Corporation for National Service, 1996): 2-6.

[22] Timothy K. Stanton, Dwight E. Giles, & Nadinne I. Cruz. *Service-Learning: A Movement's Pioneers Reflect on Its Origins, Practice, and Future* (Jossey-Bass, 1999)

[23] Leidig, Paul, and William Oakes. "Model for project-based community engagement." *International Journal for Service Learning in Engineering, Humanitarian Engineering and Social Entrepreneurship* Vol. 16, No. 2, 2021, pp. 1-13.