

Technology and Community Sustainable Development

Jose Alfaro

Assistant Professor of Environmental Practice

EAS 501.087

Fall, 2019

3 Credit Hours

Monday, Wednesday 1:00 – 2:30 pm

Office Hours:

By appointment at [Calendly.com/jfalfaro](https://calendly.com/jfalfaro)

Course Description

More than 1.4 billion people around the world live in abject poverty with income below \$1.25 per day. Sanitation, potable water, clean energy services, communication and other infrastructures are not available for these populations. Often “development” is considered as the provision of these services to the communities that need them through technology implementations. However, this ignores the applicability and appropriateness of the technology as well as the desires of the community.

Though well intended, provisions of technological solutions have suffered dismal failure rates. In light of that, this class explores the concepts of development and technology from a community perspective. We examine ways that systems thinking can have transformative potential by having those who will use the technologies take a self-determined path to achieve positive outcomes.

This class challenges the students to view Community Sustainable Development not as something to be done to communities, but as participation in a process with communities. It will define technology transfer, community and development, present the historical background of technological interventions as well as the present state-of-the-art, and provide strategies for using systems thinking for technology transfer. The class will also introduce and make ample use of case studies and procedures developed by Sustainability Without Borders, a SEAS sponsored student organization that has been active in Sustainable Development and technology transfer.

Target Audience

This class is intended for students who are interested in sustainable and international development. Students interested in international environmental careers or project management positions may also find this class useful. If you are interested in working for an NGO, non-profit environmental organization, UN branch or program, USAID, World Bank or similar organizations you will find this class stimulating and it will provide you with skills that you can directly use in your CV and future careers.

The class is structured to challenge both social science and engineering students and facilitate their collaboration.

Learning Objectives

At the end of this class students should be able to:

- Define the concepts of community, technology and Sustainable Development
- Evaluate community needs from a systems perspective
- Apply a systems thinking framework to technology design
- Think critically about the use of technology for development and technology's capabilities and limitations

The class uses a variety of formats for instruction, including lectures, case studies, readings, group discussions, presentations, pilot scale demonstrations, and a hands-on projects.

Lectures will generally be used to present background information and introduce concepts. The case studies and readings will complement lectures and enhance students' knowledge of the state of the art. The case studies also form a foundation for the students to create a list of do's and don'ts in the use of technology for development and in engaging communities.

The group discussion will allow the class to explore its own sense of community and discover its own voice. Small research assignments and other homework will be provided as preparation for these group discussions.

Team projects will allow the students to develop hands-on experience with project development.

Grading Rubric

Component	% of Grade
Participation	5
Homework Sets	15
Midterm Exam	20
Case Study Critique	10
Final Project	30
Oral Presentation	30% of Project Grade
Written Report	70% of Project Grade
Final Exam	20
Total	100

Tentative Schedule

Week	Dates	Subject	Notes
1	9/2 – 9/6	Introduction, History and Definition of Concepts: Development, Community, Technology.	
2	9/9 - 9/13	Introduction, History and Definition of Concepts: Development, Community, Technology.	
3	9/16 - 9/20	Introduction, History and Definition of Concepts: Development, Community, Technology.	Assignment 1 due 9/16 th
4	9/23 - 9/27	Systems Thinking Frameworks for Community Development: Community Capitals Framework	
5	9/30 – 10/4	Systems Thinking Frameworks for Community Development: Community Capitals Framework	
6	10/7- 10/11	Systems Thinking Frameworks for Community Development: Community Capitals Framework	Assignment 2 due 10/7
7	10/14 – 10/18	Fall Break and Midterm	10/14 Fall Break
8	10/21 – 10/25	Appraising and Listening to Community	
9	10/28 – 11/1	Creating a Project: Baseline and Human Centered Design	Assignment 3 due 10/28
10	11/4 – 11/8	Project Planning and Management	
11	11/11 – 11/15	Case Studies and Practitioner's Perspective	Case study critiques in class
12	11/18 – 11/22	Top down and Bottom Up Technology Transfer: National Technology Needs Assessments	
13	11/25 – 11/29	Technology Examples: Energy, Water, and FEW	Thanksgiving week
14	12/2 – 12/6	Technology Examples: Energy, Water, and FEW	

15	12/9 – 12/13	Final Project Presentations	
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Required Readings

Human needs

- Maslow, Abraham Harold. "A theory of human motivation." *Psychological review* 50.4 (1943): 370.
- Alkire, Sabina. "Dimensions of Human Development." *World Development* 30.2 (2002): 181–205.

What is development?

- United Nations Development Program. *Human Development Report 1990*. New York: United Nations, 1990.
 - Page 1-16
- United Nations Development Programme, Human Development Report 2015: Work for Human Development, New York, 2015.
 - Pages 1-25 (the Overview)
 - Browse the statistical annex starting on page 203

Technology and its history in development

- Lucena, Juan, Jen Schneider, and Jon A. Leydens. Engineers and Development: From Empires to Sustainable Development in *Engineering and sustainable community development. Synthesis Lectures on Engineers, Technology, and Society* 5.1 (2010): 13-53.
- Mulder, Karel. "Technology: The Culprit or the Saviour?" *Sustainable Development for Engineers: A Handbook and Resource Guide*, Routledge, 2006, pp. 117–46.

Defining community

- Smith, M. K. (2001) 'Community' in *the encyclopedia of informal education*, <http://www.infed.org/community/community.htm>

Systems Thinking

- Amadei, Bernard. "A System Dynamics Approach to Community Development." *Engineering for Sustainable Human Development*, 2014, pp. 217–43.

Development Frameworks

- I. Gutierrez-Montes, M. Emery, E. Fernandez-Baca, The Sustainable Livelihoods Approach and the Community Capitals Framework: The Importance of System-Level Approaches to Community Change Efforts, *Community Dev.* 40 (2009) 106–113.
- U.K. Department for International Development, Sustainable Livelihoods Guidance Sheets. (1999). doi:10.1002/smj.
- Flora, Cornelia Butler, et al. “Community Capitals and the Rural Landscape.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2018, pp. 5-32.
- Flora, Cornelia Butler, et al. “Natural Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2015, pp. 37-69.
- Flora, Cornelia Butler, et al. “Built Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2015, pp. 259–96.
- Flora, Cornelia Butler, et al. “Financial Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2015, pp. 217–58.
- Flora, Cornelia Butler, et al. “Political Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2016, pp. 183–216.
- Flora, Cornelia Butler, et al. “Human Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2016, pp. 109-153.
- Flora, Cornelia Butler, et al. “Cultural Capital.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2016, pp. 71-108.
- Flora, Cornelia Butler, et al. “Social Capital and Community.” *Rural Communities: Legacy and Change*, 5th ed., Westview Press, 2016, pp. 155-182.

Appraising and Listening to Community

- Amadei, Bernard. “Defining and Appraising Community.” *Engineering for Sustainable Human Development: A Guide to Successful Small-Scale Community Projects*, ASCE Press, 2014.

Required Viewing

- *Blindsight*. Dir. Lucy Walker. Robson Entertainment, 2006, Film.

Creating a Project

- IDEO. *The Field Guide to Human-Centered Design*. 1st ed., 2015.

Additional Resources and Further Reading

- Appropedia: a wiki for sustainable development, *appropriate technologies*, and *poverty reduction*. http://www.appropedia.org/Appropriate_technology
- Green Growth Knowledge Platform
- Sustainable Development Knowledge Platform <http://sustainabledevelopment.un.org>
- Zero Emissions Research Initiative <http://www.zeri.org/ZERI/Home.html>

- Gaviotas, book and website <http://www.friendsofgaviotas.org>
- Weissman, A. (1998). *Gaviotas: A Village to Reinvent the World*. Vermont: Chelsea Green Publishing Company.
- J. R. Mihelcic, L. M. Fry, E. A. Myre, L. D. Phillips, and B. D. Barkdoll, *Field Guide to Environmental Engineering for Development Workers*. Reston, VA: ASCE Press, 2009.
- Amadei, Bernard. Engineering for Sustainable Human Development : A Guide to Successful Small-Scale Community Projects. Reston, US: ASCE, 2014. ProQuest ebrary. Web. 15 August 2016.
- United Nations Development Programme. *Human Development Report 2013: The Rise of the Global South*. New York: United Nations, 2013.
 - Page 1-18
 - Browse the statistical annex starting on page 140
- E. Park, J.Y. Ohm, Appropriate technology for sustainable ecosystems: Case studies of energy self-reliant villages and the future of the energy industry, *Sustain. Dev.* 83 (2015) 74–83. doi:10.1002/sd.1574.