Community Sustainable Development and Appropriate Technology

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NRE 501.087
Winter 2015
Monday, Wednesday 8-10:30am
3 Credit Hours

Course Description

Though well intended, development projects and 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.

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.

The class teaches students about available appropriate technologies and encourages the active critique and redesign of these technologies in light of community feedback. It also provides strategies for listening and empathizing with communities to define areas of need and engage in system-based solutions for those needs. It challenges the students to view Community Sustainable Development not as something to be done to communities, but as participation in a process with communities.

This class also prepares for participation in a new class planned for Summer 2015: Practice in Community Sustainable Development. The summer experience will involve international travel to work on a development project alongside the student organization Sustainability Without Borders and a community in the Global South.

Target Audience

This class is intended for students who are interested in sustainable development and international development. Students interested in international environmental careers 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.

Advanced technical knowledge is not required although students with technical inclinations may find the class more interesting.
Learning Objectives

- Define Sustainable Development from different perspectives; Funders (World Bank, UNDP). Communities (village members, civil organizations, NGO’s), Program officers (Peace Corps Volunteers, USAID implementing specialists, UNDP program managers, NGO staff and volunteers)
- Gain general knowledge of different technologies available for provision of basic needs, their strengths, and weaknesses
- Adopt at least one listening method that enables collaboration with communities
- Develop capacity for critical analysis of technologies through community feedback
- Create a systems thinking framework that relates communities’ needs and resources to available technologies for development

Learning Outcomes and Vehicles

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

- Understand the importance of community engagement in development efforts
- Think critically about the use of technology for development and appropriate technology’s capabilities and limitations
- Engage with communities for evaluation of needs
- Evaluate community needs from a systems perspective
- Recommend appropriate technologies for satisfaction of communities expressed needs

The class uses a variety of formats to achieve the learning objectives, including lectures, case studies, readings, group discussions, presentations, and a role-playing game.

Lectures will generally be used to present background information and introduce technologies and their characteristics. The case studies and readings will complement lectures and enhance students’ knowledge of different technologies. 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. These might include exercises related to the technologies studied such as assessment of capacity for a water filter or calculation of average output of a solar panel.

The class will include a role-playing game where students will practically analyze their learning. Each student will take part in two groups: a community group and a development group. Development groups and community groups will work together to design a development project that uses one of the technologies studied and satisfies the community’s perceived needs based on resources provided.
### Grading Rubric

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<tr>
<th>Component</th>
<th>% of Grade</th>
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<tr>
<td>Participation</td>
<td>20</td>
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<td>Homework Sets</td>
<td>10</td>
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<tr>
<td>Midterm Exam</td>
<td>20</td>
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<tr>
<td>Role Play Game</td>
<td>30</td>
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<td>Final Exam</td>
<td>20</td>
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<td>Total</td>
<td>100</td>
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### Tentative Schedule

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<thead>
<tr>
<th>Monday</th>
<th>Wednesday</th>
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<tr>
<td>1/7</td>
<td>What is development</td>
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<tr>
<td>1/12</td>
<td>Human needs</td>
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<td>1/14</td>
<td>Analyzing technology and its history in development</td>
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<td>1/19</td>
<td>Defining community</td>
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<tr>
<td>1/26</td>
<td>Listening</td>
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<td>1/28</td>
<td>Listening models</td>
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<td>2/2</td>
<td>Defining Technology and &quot;Appropriate Technology&quot;</td>
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<td>2/4</td>
<td>Technology as system nodes and catalysts</td>
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<td>2/9</td>
<td>Industrial Symbiosis and Integrated Biosystems</td>
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<td>2/11</td>
<td>Energy Technologies</td>
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<td>2/16</td>
<td>Midterm</td>
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<td>2/18</td>
<td>Spring Break</td>
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<td>2/23</td>
<td>Case Study Reviews: Failures, Successes, and future</td>
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<td>2/25</td>
<td>Final Exam (Date TBD)</td>
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<td>3/2</td>
<td>Work</td>
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<td>3/4</td>
<td>Monitoring and evaluation</td>
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<td>3/9</td>
<td>What would I do different?</td>
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<td>3/11</td>
<td>Role Playing Game Presentations</td>
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<tr>
<td>3/16</td>
<td>Final Exam (Date TBD)</td>
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Class Schedule and assignments

What is development?


Human needs


Analyzing technology and its history in development


Defining community

1/21 Guest lecture


Listening and Listening Models


Defining Technology and "Appropriate Technology"

2/9 “Technology in a bag” exercise, small group activity, group discussion

- Browse Appropedia.org
Industrial Symbiosis and Integrated Biosystems

2/16 Lecture, group discussion

Energy Technologies
2/18 Small group exercise: Playing with fire
2/23 Small group exercise: Designing an energy technology

Water Technologies
3/11 Small group exercise: Would you drink this? Would you drink it out of that?

Sanitation Technologies
3/18 Small group exercise: Every person’s throne

Food Technologies
3/25 Small group exercise: Growing food on the moon

Case Study Reviews: Failures, Successes, and Future
3/30 Case studies will be posted on Ctools.
Small group formation and preparation for case study reviews

4/1 Team discussions and team exchanges
4/6 Informal case study review presentations

Monitoring and Evaluation
Readings TBD

What would I do different?
4/13 Before class you will be assigned a development project in small groups
Provide a presentation on what you would have done different, including ideas on how to monitor and evaluate the program outcomes with a special focus on sustainability’s three E’s: economic viability, environmental stewardship, social engagement.

Role Playing Game Presentations
4/15 Role Playing Game: Dealing with the Hand We are Dealt
& 4/20 Before this class you will be split into small groups. Your group will have to participate in two rounds of the role playing game. In one round you will be a Community Team, in
the second you will be an implementing body of community sustainable development practitioners or an Implementing Team.

Playing Community:
Each team will be dealt a set of cards. The cards will include resources, needs, and constraints. For example your resources might include a large volume flow river and well drained soils. Your needs might be electricity, nutrition, and income. Your constraints might be local beliefs that demand your community never disrespect the River god. You will also be given a “type” card. This will determine the type of community you are: a village, an association, a coop, an NGO, etc.

As a team you must find a way to form a voice to explain the situation to the Implementing Team you will be partnered with. You are not allowed to show them the cards. You must decide on priorities, communication forms, and desires.

After the game round you will be required to evaluate the performance of the Implementing Team. Your partner Implementer will also evaluate your performance gauging how effectively you combined your voices and communicated your resources, needs, and desires.

Playing Implementer:
Your team will have to partner with a Community Team. You will be in charge of listening empathetically to their needs and desires. You will also be in charge of determining a course of action to fulfill their needs using their resources and considering their development and desires as a system. You are encouraged to use “appropriate” technologies. Your project must include a monitoring and evaluation plan, an implementation plan, and an exit strategy.

Your partner Community Team will be grading your performance based on your ability to use their resources sustainably, your listening skills, and your implementing plans. Your instructor will evaluate your performance as well and include your exit strategy.

During Presentations
Your team should present both your experiences as a Community and Implementer. Before the class you will be provided with a rubric you should use to evaluate your partner team performance. I will also provide you with the rubric I will use to evaluate your performance both as a Community and an Implementer.

Additional Resources and Further Reading
- Appropedia: a wiki for sustainable development, appropriate technologies, and poverty reduction. [http://www.appropedia.org/Appropriate_technology](http://www.appropedia.org/Appropriate_technology)
- Gaviotas, book and website [http://www.friendsofgaviotas.org](http://www.friendsofgaviotas.org)