



Online Ethics Center  
FOR ENGINEERING AND SCIENCE

# Learning to Listen: A Tool for Morally Engaged Engineering Practice

## Author(s)

Yanna Lambrindou  
Marc Edwards  
Erin Heaney  
Rebecca Newberry

## Description

This activity is considered an NAE Exemplar in Engineering Ethics Education and was included in a 2016 [report](#) with other exemplary activities. Learning to Listen” (L2L) teaches engineers the method of ethnographic listening to diverse publics who are affected by engineering interventions but whose voices are often ignored.

## Body

### Exemplary features:

Addresses the ethical responsibilities of engineers to engage with the public and other stakeholders

### Why it's exemplary:

Learning to Listen” (L2L) teaches engineers the method of ethnographic listening to diverse publics who are affected by engineering interventions but whose voices are often ignored. It cautions that failure to consider such voices can leave engineers vulnerable to incomplete understanding of complex issues, self-interest, and institutional pressures, contributing to suboptimal professional decisions, unethical conduct, and even public harm. Based on the premise that morality is not a fixed theoretical body of knowledge that exists apart from day-to-day living and professional practice, L2L challenges the notion that comprehension of moral codes, theories, and principles alone equips engineers to determine what constitutes “ethical” professional conduct in different contexts. The training is unique in fostering ethical decision making not as abstract determinations of “right” and “wrong,” but as direct engagement with local experiences, knowledges, and values, and careful assessment of what in each context constitutes appropriate use of professional power and technical expertise.

## **Program description:**

L2L is one of four thematic units in Virginia Tech’s Civil and Environmental Engineering graduate-level course Engineering Ethics and the Public (CEE 5804). Emphasizing that morally sound engineering research, practice, and stewardship necessitate acute awareness of the perspectives of those affected by engineering interventions, it cross-cuts the course’s three other units: Responsible Conduct of Research, Responsible Conduct of Practice, and Witnessing Wrongdoing and the Obligation to Prevent Harm. Yanna Lambrinidou, a medical ethnographer, and Marc Edwards, an environmental engineer, cofounded CEE 5804 in 2010 to highlight critical ethical lessons from a multiyear effort to understand and redress the still-unfolding effects of Washington, DC’s historic lead-in-water contamination of 2001–2004. At the center of this case are residents who first suspected a serious problem with hazardous levels of lead in their drinking water and several groups of government agency engineers and scientists who helped conceal the contamination and ultimately covered up the extensive public health harm it caused. The DC story lends itself to teaching engineering ethics through real-world events and through the voices of local residents and other stakeholders who were impacted. Our course, which is offered every fall, was funded in 2011 by NSF’s Ethics Education for Science and Engineering (EASE) program. Today the over 2 million practicing engineers in

the United States routinely make complex and critical decisions with significant implications for the public's health, safety, and welfare in a relational vacuum, where affected publics are rarely seen and almost never heard. Yet the experiences, knowledges, and values of these publics often provide crucial insight and sometimes correction with respect to engineers' areas of technical expertise and moral responsibility. The goal of L2L is to teach that morality is not a fixed theoretical body of knowledge that exists apart from day-to-day living and professional practice. Therefore, it ought not be considered a neutral "compass" that engineers can use to determine relevant moral questions without an understanding of what is locally at stake in each case. Rather, to promote the public good in morally sound and socially just ways, engineers must complement their knowledge of moral codes, theories, and principles with empirically derived understandings of the experiences, knowledges, and values of the publics affected by their work. Similarly, they must know that institutionally sanctioned claims and histories may exclude important facts. With an expanded awareness about the complexities of a case—especially in relation to potential uncertainties and disagreements about the science, costs, practical benefits, and acceptable risks as well as power differentials among stakeholders—engineers can be in a better position to identify moral dilemmas and make thoughtful decisions about morally sound responses to them.

L2L combines (1) readings/lectures about local knowledge and the role diverse publics have played in successfully complementing, advancing, and challenging dominant paradigms of engineering/scientific thought and practice, with (2) semester-long, hands-on training in the critically important first steps of gathering the often-confusing and sometimes-concealed facts of real-world controversies involving engineering interventions. Offering in-depth ethnographic listening as a tool for empirically based understandings of the moral dimensions of a case, the training consists of three exercises. The first two prepare students for the third, the term project (assignment link provided below):

(2a) Anatomy of in-depth listening: Students write about four of their own experiences with in-depth listening: two as speakers, two as listeners, two positive, and two negative. They describe behaviors, observations, and feelings they remember, concluding with a reflection on what "good" and "bad" listening look and feel like and what effects they can have on one's capacity to express oneself or relate to others. Responses are compiled for everyone's review.

(2b) Practice of in-depth listening: Students conduct one face-to-face interview with someone they know well. They focus on understanding views that their interviewee holds but that they, themselves, find objectionable. The goal is to gain clarity on those views and the reasons behind them, while refraining from interpretation and judgment. Students are advised to ask all questions necessary to see the subject in question from their interviewee's perspective. They are reminded that their task is to understand, not necessarily to agree. Written reports provide reflection on what students learned and how they performed as interviewers. The latter assessment includes interviewee feedback as well.

(2c) In-depth listening in engineering and science: Students conduct a sustained investigation into an unfolding engineering controversy, which culminates in one in-depth ethnographic interview of an affected stakeholder (e.g., parent, grassroots community organization representative, scientist advocate) whose voice is underrepresented or misrepresented in official depictions of the case.

Final reports consist of a detailed description of the case; a discussion of key moral transgressions as identified by interviewees; "lessons learned" that changed students' original understanding of the case; reflections on the conduct of engineers/scientists in the case; and thoughts on actions the students themselves would want to have taken if they were involved. Usually each student selects a topic. In 2012, however, we partnered with the grassroots environmental health and justice organization Clean Air Coalition of Western New York (CACWNY), which at the time was a key stakeholder in an unfolding engineering controversy (syllabus and paper link provided below). Students collectively conducted extensive background research on the case and were paired up individually with local stakeholders for ethnographic interviews. This was an especially powerful experience for many because it amplified their research and personal connection to the case (student blog link provided below). Two students subsequently joined Lambrinidou on a field trip to CACWNY. The experience reinforced takeaway messages from the class, which they highlighted in a talk to CEE 5804 the following fall (video excerpt link provided). We consider our partnership with CACWNY a model and readopted it in fall 2015 with a community in Flint, MI; a colleague will adopt it in 2016 with a community in Seattle for a new engineering ethics undergraduate class at Seattle University.

# Assessment information:

Our ultimate goal is to facilitate a change in how students see themselves and their professional responsibility in relation to the safety, health, and welfare of the public. Although we lack long-term data on whether our activity (and course more broadly) is meeting this goal, we have some evidence that, at least in the short-term, it helps shift students' thinking in fundamental ways. We draw on two assessment questionnaires. The first, administered at the end of fall 2012, solicited student views about the main components of the course (e.g., lectures, readings). Student comments on the L2L unit revealed the following emerging themes: (a) 12 of 15 students noted that their exposure to real-world unfolding cases and the perspectives of marginalized stakeholders rendered engineering ethics "real," "meaningful," and "personal" because it gave "a face" to the ideas, concepts, and principles taught in class, making them more understandable and memorable, and inspiring self-reflection; (b) 9 of 15 students noted that their newly acquired ability to investigate a controversy ethnographically empowered them to uncover important dimensions of the case that were absent from official reports, and "brought the case home" on a deeper level than a literature review alone would have allowed. The second questionnaire, administered in fall 2013, was used to compare students' pre- and postinstruction understandings about key ideas, concepts, and principles introduced in the course. A qualitative analysis of responses revealed several shifts, three of which pertained directly to engineers'/scientists' relationship with "the public": (a) At the beginning, students associated engineering/science ethics with abstract rules. At the end, their understanding revealed a shift to how engineers/scientists operate in real-world contexts and, more specifically, to their relationship with the diverse publics affected by their work. (b) At the beginning, students characterized "the public" as different and separate from engineers/scientists (e.g., general population, "herds of sheep," organizations/companies). At the end, numerous students described it in relation to engineers/scientists, focusing on the power differential between the two (i.e., the public being affected by engineers/scientists but having limited control over their work). (c) At the beginning, students tended to view engineers'/scientists' interactions with the public as risky because they felt that individuals who lack proper training can misunderstand or misinterpret technical information. At the end, students added to these risks that the information communicated by

engineers/scientists can sometimes itself be inaccurate, incomplete, or even deceptive. Some students also asserted that engineers/scientists should not hesitate to communicate technical information to nonexperts because the public has a “right to know” and, when treated with respect, can be a “powerful ally.” These responses suggest that the ethnographic component of our class helps expand how students see engineering/science ethics and inspires them to reimagine (a) who “the public” is, (b) who they, as engineers/scientists, are, (c) what the power differential between experts and nonexperts might be, and (d) how they can relate to the publics they might one day affect in collaborative and empowering, rather than paternalistic or exploitative, ways.

## **Additional resources:**

1. L2L assignment: <https://www.filesanywhere.com/fs/v.aspx?v=8b6f6a895c6072aca8>
2. 2012 Syllabus: <https://www.filesanywhere.com/fs/v.aspx?v=8b6f6a8b595e6fab72a2>
3. ASEE paper 2014: [www.asee.org/public/conferences/32/papers/10155/view](http://www.asee.org/public/conferences/32/papers/10155/view)
4. 2012 student blogs: <https://blogs.lt.vt.edu/vt5804ethicsandpublic2012/>
5. Video excerpt of student presentation: <https://vimeo.com/138734465>

### **Rights**

Use of Materials on the OEC

### **Resource Type**

Educational Activity Description

### **Parent Collection**

NAE Exemplars in Engineering Ethics Education

### **Topics**

Public and Community Engagement

### **Discipline(s)**

Engineering

Teaching Ethics in STEM