# Literature for Specific Purposes: A Literary Approach to Teaching Ethics in Science and Technology

(article starts on next page)

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"Scientists need the same skills as humanists to cut through misleading observations and arrive at a defensible interpretation, and intellectual cross-training in the humanities exercises the relevant portions of the brain."

—Thomas Cech[1]

Education in science and technology faces a constellation of problems regarding how students master the nontechnical skills that are essential for the successful execution of their professional duties. In particular, educators struggle to provide sound training in ethics, and in this essay I focus specifically on engineering education.[2] I here propose a schema with which to teach ethics by marrying humanities methods with engineering concerns, primarily through the targeted selection of literary texts, direction of subsequent discussion,

1. Thomas Cech is a Nobel-Prize-winning chemist. Thomas R. Cech, "Science at Liberal Arts Colleges: A Better Education?," *Daedalus* 128:1 (1999): 195–216, at p. 210.

2. Numerous calls for more or better training in engineering ethics have been published. For a representative rather than exhaustive sampling, see Diana Bairaktarova and Anna Woodcock, "Engineering Ethics Education: Aligning Practice and Outcomes," *IEEE Communications Magazine*, November 9, 2015, pp. 18–22, doi:10.1109/MCOM.2015.7321965; L. L. Bucciarelli, "Ethics and Engineering Education," *European Journal of Engineering Education* 33:2 (2088): 141–149, doi:10.1080/03043790801979856; and Debapriya Boswami and Amitayu Chakraborty, "Sensitizing Engineers: A Brief Study of the Role of Ethics in Engineering Education," Engineering (NUiCONE), 2015 Nirma University International Conference on Engineering (November 26–28, 2015), doi:10.1109/NUICONE.2015.7449589.

and construction of assignments to meet discipline-specific learning outcomes. As a scholar trained in literary criticism but who works at a technical university, I draw on my unique background to bridge what are often viewed as radically disparate areas of study. What I discuss in this essay is part of a larger project that takes an interdisciplinary approach to teaching science and technology that I call "literature for specific purposes." This phrase consciously echoes the name of the "language for specific purposes"[3] approach, which teaches language within the context of a scientific or professional discipline. By uniting the focused approach of language for specific purposes with the opportunity for discussion afforded by literary interpretation, the literature for specific purposes approach provides a beneficial framework for the teaching of many discipline-specific concerns, and I discuss this by using ethics as an example.

Because the language for specific purposes approach is an overt model for my approach, defining that approach is necessary, as is explaining how the literature for specific purposes model departs from it. The term "specific" is key because, in the language for specific purposes approach, "teaching activities are specific to the subject matter being taught."[4] That is, the disciplinary context dictates all elements of course construction. This approach emphasizes instructors' focus on "the gap between learners' current and target competencies,"[5] and relies on clear learning outcomes to drive course, text, and assignment selection. Moreover, instructors must enter "as a stranger into strange domains—academic and occupational areas that may feel quite unfamiliar."[6] Therefore, in these "specific purposes" interventions, instructors rely on the content knowledge of experts in the discipline in the course planning, using their own expertise to select methodologies for learning. Where the two approaches differ most is in the texts that form the basis of their work. Language for specific purposes primarily uses authentic examples of texts that students will encounter in academic or professional work. In contrast, literature for specific purposes uses carefully selected literary texts

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3. While it is usual to refer to language for specific purposes as "LSP," I avoid doing so in this essay because of the obvious potential confusion with my phrase "literature for specific purposes."

4. Helen Basturkmen, *Ideas and Options in English for Specific Purposes* (Mahwah, NJ: Lawrence Erlbaum Associates, Publishers, 2006), p. 103.

5. Diane Belcher, "What ESP Is and Can Be: An Introduction," in *English for Specific Purposes in Theory and Practice* (Ann Arbor: University of Michigan Press, 2009), pp. 1–20, at p. 2.

6. Ibid.

that meet the learning outcomes and course goals. For instance, if issues of professional authorship are key, students could read Percival Everett's novel *Erasure* (2001)[7] about a fiction writer who has falsified an identity in order to be published. Or, for a narrative involving the fitting of results to a predetermined conclusion, Roald Dahl's "Taste" (1951),[8] a short story about wine experts competing to show who has the greater knowledge, could be used.

Literary thinking (the careful examination of plot, character, narrative, and other literary elements to come to a greater understanding about key issues in a text) lends itself well to ethical thinking (the careful examination of actions and beliefs to come to a greater understanding of morality or rules of conduct),[9] but it is important to tailor literary exploration to the needs of the discipline in which the ethical study is sought. Therefore, to target ethical aspects that will resonate with students, course goals must be developed in concert with instructors from the students' discipline.[10] Peter Read has argued that course design in language for specific purposes should "involve three main stages: analysis of learner needs; definition of course objectives; translation of objectives into pedagogical practice,"[11] and those stages apply here as well. Effectively analyzing learners' needs for instructors outside of the students' discipline would be difficult, so consultation with instructors within the discipline is necessary. Once literature instructors have a sense of key issues in the field, they can find a relevant literary text that addresses one or more of those issues to meet the desired course objectives.

Assignments should be crafted to allow students to see plot events from the perspective of one of the text's fictional characters, ideally

7. Percival Everett, *Erasure* (New York: Farrar, Strauss, Giroux, 2001).

8. Roald Dahl, "Taste," *New Yorker*, December 8, 1951, pp. 36–41.

9. My definitions here of literary and ethical thinking are presented as simplifications of these concepts to indicate their characteristics that would likely be of most use in the literature for specific purposes approach. These definitions are not, however, intended to restrict the ways that instructors would employ these concepts.

10. If this registers to some readers as assigning literature a status that is subordinate to science, I would like to emphasize that I am not suggesting that literature for specific purposes should *replace* any student's required literature or humanities courses but instead *supplement* them. Literature for specific purposes is intended as an approach to enhance the learning of students in scientific and technological fields and in no way should compromise the teaching of literature as its own separate field, nor do I suggest that it replace extant humanities requirements for students in scientific or technical courses of study.

11. Peter Read, "Language Teaching for Specific Purposes: Finding Common Ground," *The Language Learning Journal* 4:1 (1991): 70–71, at p. 70.

so as to allow for easier transfer of discussion from the ethical situation in the text to ethical problems in the students' field. Moving the discussion from the specifics of a narrative's ethical situation to elements of ethical debate in the students' discipline will help students apply their thinking to practical situations. Ethics-focused discussion in the literature for specific purposes approach capitalizes on the plurality of student perspectives to contribute to a nuanced and communally built discussion of disciplinary norms and ethical principles.

Literature is particularly well suited to foster such discussion. In this essay, I have offered examples of literary fiction rather than poetry to sidestep necessary further explication for those students who lack familiarity with poetic forms, because I assume that most interventions would not likely have time sufficient for such explication. However, narrative poems such as Robert Browning's "The Laboratory" (1844),[12] in which a chemist obediently concocts a poison for a demanding patron, might find a beneficial place in some instructors' courses. Narrative fiction in particular works well because, when examining real-world case studies, students may feel pressured to provide the one "correct" answer, and therefore may shape their responses accordingly. However, narrative's degree of removal from student's lives relieves that pressure, seldom allowing for only one answer, and "narrative can be seen as a vehicle by which people test various scenarios without risking too much."[13] These diminished risks allow for intellectual and logical experimentation that nonfiction texts might not, in part because "fiction is always about someone other than the reader," and therefore readers are not implicated in the adjudication of ethical issues in fiction in the same way that they would be when discussing actual case studies.[14] Further, narrative has one key dissimilarity to students' experience that renders it useful as a vehicle for teaching ethics, and that is its greater "unity of parts," or "internal resonance."[15] In other words, lived lives are less planned and less structured than narratives, so narratives provide closed systems within which to explore ethical topics. Extraneous

12. Robert Browning, "The Laboratory," in *Robert Browning: Selected Writings*, ed. Richard Cronin and Dorothy McMillan (Oxford: Oxford University Press, 2015), p. 115.

13. Blakey Vermeule, *Why Do We Care About Literary Characters*? (Baltimore: Johns Hopkins University Press, 2009), p. 41.

14. A. L. Kennedy, "Fiction, Resistance, and the Reading Public," *Index on Censorship* 31:2 (April 2002): 177–193, at p. 183.

15. Marshall Gregory, *Shaped by Stories: The Ethical Power of Narratives* (Bowling Green, KY: University of Bowling Green Press, 2009), pp. 58–59.

information thus more easily can be excised from discussion of a narrative, allowing the students to focus on the ethical dilemma at hand, and the amount of material available for discussion is finite, which allows instructors to plan and direct discussion with fewer elements that might distract students.

To facilitate the transfer of the ideas raised by literary texts to ethical issues in their discipline, instructors in the literature for specific purposes classroom must overtly connect the fictional (and possibly abstract) ethical dilemmas to the practical, real-world ethical problems that the students are likely to face in their careers. The act of discussion is of the utmost importance in this approach, as witnessed by Brian Stock's principal objection to the teaching of ethics through literature. He argues that the central problem "with the routine method of ethical instruction through literature, in the ancient world as nowadays, is that it leads invariably to the production of forms of thought rather than forms of behaviour."[16] Stock's solution is to "ground ethical instruction in the personal experience of the individual, where it had a legitimate place in the ancient, medieval, and Renaissance periods."[17] The implementation of literature for specific purposes capitalizes upon narrative's ability to add to students' understood experience without requiring them to add to their personal lived experiences, turning the weakness that Stock identifies into a strength. Indeed, Marshall Gregory has argued that story "is first of all a form of experience, not a form of intellectual discourse," which allows for it to stand in for personal experience in useful ways.[18] Additionally, the *study* of story does constitute a form of intellectual discourse, allowing students to process their reading experience at a more than merely emotional level. The careful choice of texts is required for such processing, however, and discussion is key to make clear connections between the issues in the narratives and the main learning objectives of a specific course.

One key way to transfer fiction-based ethical discussions to discussions of professional ethics involves the use of real-world ethics codes in lieu of literary theory in interpreting fictional texts. For example, students could answer questions such as: "Does the novel's main character violate this aspect of the Institute of Electrical and Electronics Engineers' code of ethics: 'be honest and realistic in

16. Brian Stock, "Ethics and the Humanities: Some Lessons of Historical Experience," in "Essays on the Humanities," special issue, *New Literary History* 36:1 (Winter 2005): 1–17, at p. 6.

17. Ibid., p. 16.

18. Gregory, *Shaped by Stories* (above, n. 15), p. 21.

stating claims or estimates based on available data?'[19] Why / to what extent? Or why not?" Because "transfer occurs when people make use of prior experiences to address new challenges,"[20] but students often come to the classroom with little experience in their field, the experiences represented in fiction can supply what is lacking. But because experience alone cannot be presumed to impart ethics, the framework of extant ethics codes serves as an important component of discussion and reflection.

While the literature for specific purposes approach is broadly applicable, I write from a Swedish context. Unlike collegiate education in the United States, university teaching in Sweden does not follow a liberal arts model, so students' university studies are narrowly focused. One consequence is that students engage solely in career preparation courses (as distinct from notionally citizen-, character-, and interest-building courses that appear in liberal arts curricula). Subsequently, the literature for specific purposes model takes the preparation of students for their careers as a central goal. However, while the genesis of this idea occurred within a Swedish environment, it also foregrounds a problem in the United States, where defunding of the humanities frequently occurs because of the perceived lack of connection between humanities training and job preparation.[21] So although I do not in any way suggest that literature for specific purposes training should *replace* the literary instruction as it fits into the liberal arts model, I do suggest that this framework could very beneficially *supplement* the extant liberal arts methods of teaching literature by tracing more overt connections between literature and the technical and scientific fields.

I have focused exclusively on ethics in this brief overview, but the exploration of ethics is not the only use of a humanities-based intervention into science pedagogy. Many scholars have detailed

19. Institute of Electrical and Electronics Engineers, "Code of Ethics," *IEEE Policies*, part A, section 7, n.d., accessed October 17, 2017, https://www.ieee.org/about/corporate /governance/p7-8.html.

20. Michelle Navarre Cleary, "Slowing and Freestyling: Learning from Adult Students about Process Transfer," *College Composition and Communication* 64:4 (June 2013): 661–687, at p. 662.

21. Examples of such arguments are detailed in Patricia Choen, "A Rising Call to Promote STEM Education and Cut Liberal Arts Funding," *New York Times*, February 21, 2016, https://www.nytimes.com/2016/02/22/business/a-rising-call-to-promote-stem -education-and-cut-liberal-arts-funding.html. See also Charles Huckabee, "N.C. Governor Wants to Tie University Support to Jobs, Not Liberal Arts," *Chronicle of Higher Education*, January 29, 2013, http://www.chronicle.com/blogs/ticker/north-carolina-gover nor-wants-to-tie-university-support-to-jobs-not-liberal-arts/54787.

the benefits of the humanities to technological and scientific fields, including the inspiration of new ideas, ability to shape productive citizens, generation of creative thinking, contribution to inculcating empathy, and aiding in strengthening critical thinking.[22] Further work in establishing practical curricular activities in these areas, however, is sorely needed. It is my hope that literature for specific purposes can stand as an example of such practical intervention into the humanities-based enhancement of the teaching of science and technology.

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22. These scholars' works include, but certainly are not limited to, Adeel Khalid, Craig A. Chin, Mir M. Atiqullah, John F. Sweigart, and Beth Stutzmann, "Building a Better Engineer: The Importance of the Humanities in Engineering Curriculum" (paper #6052, ASEE Annual Conference & Exposition, June 23–26, 2013, Atlanta, GA); Induja Bandara, "Integrating the Humanities throughout Undergraduate Teaching: A Challenge for GP Educators," *Education for Primary Care* 15:2 (May 2004): 251–257; Troy Camplin, "Scientists and Engineers Need Literature," The James G. Martin Center for Academic Renewal, April 7, 2013, https://www.jamesgmartin.center/2013/04/scientists-and-engineers-need-literature/; Joshua Landy, *How to Do Things With Fictions* (Oxford: Oxford University Press, 2012); Rebecca Nesbit, "Scientists: Let's Embrace Fiction as Well as Facts," *The Biologist* 62:3 (June/July 2015): 5; Robert Ruprecht, "Humanities in Engineering Education," *European Journal of Engineering Education* 22:4 (1997): 363–375; and Harold P. Sjursen, "The New Alliance between Engineering and Humanities Educators," *Global Journal of Engineering* 11:2 (2007): 135–142.