Online Ethics Center
FOR ENGINEERING AND SCIENCE

Engineering and Social Justice Bibliography

Author(s)

Kelly Laas

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Description

A collection of web resources, books and articles related to social justice in engineering

Body

Associations and Web Resources

Engineering, Social Justice, and Peace.
A network of academics, engineers and students from a wide range of disciplines in engineering dedicated to enhancing engineers' understanding of the role and practice of engineering in local and global communities and its role in enhancing or reducing social justice.

Engineers Against Poverty
An NGO that works with partners in industry, government and civil society to help identify ways in which science, engineering and technology can help address

challenges in international development.

Engineers for a Sustainable World

A national, non-profit network of students, university faculty and professionals who are dedicated to build a more sustainable world for future generations. College and university chapters of ESW help mobilize students and faculty members through education programs, sustainability-oriented projects, and volunteer activities that foster practical and innovative solutions to address the world's most critical challenges.

Engineers Without Borders

The web site for the U.S. chapter of Engineers Without Borders, an organization that sponsors over 350 projects in 45 nations focusing on finding solutions for the challenges facing developing communities such as clean water, sanitation, and renewable energy.

Books

Baille, Caroline. 2006. *Engineers within a Local and Global Society*. San Rafael: Morgan and Claypool Publishers.

This introductory book of the series Synthesis Lectures on Engineers, Technology and Society discusses how engineering in the past has been used to contribute to social context in the Western and developing world, and the responsibilities engineers have to learn from the past and take appropriate action related to contemporary industrial development and globalization. The author concludes by presenting a case study of her own engineering for others to critique, and discusses the challenges that exist in being aware of how our engineering practice contributes to the global, social, economic and political issues, and making accordingly responsible choices. Many of the books in this series cover themes of social justice and sustainability, and most have been included below.

Baillie, Caroline and George Catalano. 2009. *Engineering and Society: Working Towards Social Justice.* San Rafael, C.A.: Morgan and Claypool Publishers. (3 volumes)

- Part I: Engineering and Society
- Part II: Decisions in the 21st Century
- Part III: Windows on Society

This series encourages engineers to think about the short and long term implications of their projects. The authors discuss the ideas associated ideas associated with the ways in which engineers relate to the communities they work within, and techniques that can be used for engaging with the public. The second volume of this series discusses the thinking processes necessary to create ethical and just decisions in engineering, to understand the implications of these decisions, and to think about ways in which engineers can adapt these decisions to become more socially just in the future. The final volume includes a large number of case studies to get readers thinking and discussing the wider impacts of engineering projects on local communities, developing countries, and the environment.

Baille, Caroline, Eric Feinblatt, Thimothy Thamae, and Emily Berrington. 2010. *Needs and Feasibility: A Guide for Engineers in Community Projects – The Case of Waste for Life.* San Rafael: Morgan and Claypool Publishers.
Discusses the case of Waste For Life (WFL), an non-profit organization that works to promote poverty-reducing solutions to environmental solutions, and its development of projects in Lesotho and Argentina that involve engineering students from six different countries in educational experiences centered around these projects. The authors use this case study as a guide for engineers, professors and students interested in community development work, and discuss the many steps that should be taken to be sure that projects effectively consider and fulfill community needs while also providing a meaningful experience for participating engineering students.

Catalano, George. *Engineering Ethics: Peace, Justice, and the Earth.* San Rafael, CA: Morgan and Claypool Publishers, 2006.
This book examines the ethical codes of engineers from a historical perspective, and describes a new model for ethical codes that includes an identified integral community that should be served and protected by practicing engineers. Applications of this new code of ethics are described through the use of case studies, and the code is used to develop a new design methodology based on the implicit notion of promoting justice and peace and reducing suffering. The author also explores the implication of these new developments for engineering education.

Catalano, George. 2007. *Engineering, Poverty and the Earth*. San Rafael, CA: Morgan & Claypool.

This short volume discusses the growing awareness in engineering of the profession's responsibility towards the environment and the poor. The author gives a brief overview of poverty in the U.S. and the destruction of the natural world, and discusses a number of case studies looking at how recent developments in engineering in relation to issues of poverty and the environment could help alleviate growing ethical issues in these areas. Case studies discussed include the shrinking of the Arctic and the aftermath of Hurricane Katrina in New Orleans.

Mitcham, Carl and David Munoz. 2010. Humanitarian Engineering. San Rafael: Morgan and Claypool Publishers.

After reviewing the development of engineering as a distinct profession, the authors look at the humanitarian engineering movement as a special socio-political practice in the United States and Europe, considers strategies for education in humanitarian engineering, and discusses challenges and implications for the future.

Lucena, Juan, Jennifer J. Schneider and Jon A. Leydens. 2010. *Engineering and Sustainable Community Development.* San Rafael, CA: Morgan & Claypool.

This book presents an overview of engineering for sustainable community development. It provides a history of engineers involved in development, the problem of using industry-based practices when designing for communities, how engineers can prepare to work with communities, and the importance of listening when involved in community development projects. The volume also includes two case studies and student perspectives on one curricular model dealing with community development.

National Academy of Engineering, Advisory Group for Engineering, Ethics, and Society. 2010, *Engineering, Social Justice, and Sustainable Community Development: Summary of a workshop*. Washington D.C.: National Academies Press.

This report from a workshop hosted by the National Academy of Engineering discusses conflicting positive goals for engineering projects in impoverished areas and areas in crisis. The goals of project sponsors which are often implicit include protecting human welfare, ensuring social justice, and striving for environmental sustainability. These implicit goals often go alongside more explicit goals of economic development or progress. The workshop discussed how to improve

engineering practices in situations of conflict or crisis, how to improve ethics education in ethics and social issues, and how to involved professional societies in these efforts.

Riley, Donna. 2008. *Engineering and Social Justice.* San Rafael, CA: Morgan & Claypool.
This book presents a roadmap for engineers, urging them to develop a passion for social justice and calling upon them to develop the skills and knowledge set needed to take practical action for change.

Reader, John. 2006. *Globalization Engineering and Creativity.* San Rafael, CA: Morgan and Claypool Publishers.
This short volume addresses the importance of globalization within engineering, particularly on working practices and prospects for creativity, and provides an introduction to the social and political context that is currently setting new challenges for engineers today.

Teich, Albert H. 2006. *Technology and the Future.* Belmont, C.A.:Thompson/Wadsworth.
A collection of important readings on technology's impact on the individual and society.

Vallero, Daniel. 2007. *Biomedical Ethics for Engineers : Ethics and Decision Making in Biomedical and Biosystems Engineering*. Boston: Academic Press.
This volume discusses the important role bioethics plays in the professional life of engineers, especially biomedical engineers. The book discusses the how engineers can incorporate a wide array of societal perspectives into their work without sacrificing sound science and good design principles. It looks at emerging fields such as nanobiotechnology, green engineering, public attitudes regarding these fields, and the full array of environmental, and the health and societal issues that need to be addressed by engineers and scientists within a global context.

Vallero, Daniel A. and A.P. Vesiland. 2007. *Socially Responsible Engineering: Justice in risk management.* Hoboken, N.J.: John Wiley Publishing Company.
This book focuses on environmental aspects of engineering ethics, gives a historic and philosophical background for the concept of environmental justice, and

discusses the technical tools necessary to help engineers evaluate projects from an ethical perspective and to properly access the risk it presents to communities that may be impacted.

Vallero, Daniel. 2006. *Paradigms lost: Learning from environmental mistakes, mishaps and misdeeds.* Boston: Butterworth-Heinermann.
This book contains a large number of case studies about environmental mistakes and disasters in engineering. Each case includes a scientific explanation of what went wrong, and how similar problems could be avoided in the future. The volume discusses issues such as ethics, risks, and reliability, how pollutants move through the environment, and best practices in dealing with environmental issues in engineering.

Journal Articles

Amadei, B. 2004. Engineering for the Developing World. The Bridge 34(2): 24-31.
This article discusses the need for the engineering profession to adopt a new mindset and vision – to contribute to the building of a more sustainable, stable and equitable world. The author discusses some of the major changes that need to be made in how engineering projects are approached by engineers, and major challenges that will need to be addressed.

Amadi, B., Robyn Sandekian and Evan Thomas. 2009. A model for sustainable humanitarian engineering projects. *Sustainability* 1(4):1087-1105.
Discusses the growth of humanitarian engineering trips and outreach projects in engineering education at various U.S. Universities, and addresses the challenges and opportunities associated with balancing two goals in engineering for humanitarian development projects; first, to attain effective sustainable community development, and second, to provide meaningful education for engineers.

Amadei, B. and W.A. Wallace. 2009. Engineering for humanitarian development. *IEEE Technology and Society Magazine.* 28(4): 6-15.
The authors discuss how engineers' work is delivered predominantly to the

developed world, often leaving developed nations without the adequate facilities and infrastructure to build sustainable facilities. The authors suggest a new form of engineering project delivery that meets the technical and social challenges involved in working with underdeveloped communities, but also delivers appropriate and sustainable solutions.

Catalano, George and Caroline Baille 2006. Engineering, social justice and peace: a revolution of the heart. *2006 ASEE Annual Conference & Exposition: Excellence in Education. Chicago IL; 18-21 June 2006.*
This conference paper offers a new paradigm for engineering education based on the Integral Model of Education for Peace, Democracy and Sustainable Development and suggests needed modifications to ABET criteria aimed at including issues of social justice and sustainable development in engineering education. The authors also propose an engineering code of ethics based on the notion of a community in a morally deep world.

Catalano, Georg, Caroline Baille, Donna Riley, and Dean Nieusma. 2008. Engineering, peace, justice and the earth: Developing course modules. *ASEEE Annual Conference and Exposition, Conference Proceedings.*
Describes an effort funded by the Pennsylvania/New York Consortium that involves faculty at institutions within the United States and Canada collaboratively developing course modules focusing on addressing issues of peace and security, poverty and sustainable development for engineering education

Downey, G.L., J. Lucena, B. Moskal, R. Parkhurst, T. Bigley, C. Hays, B. Jesiek, L. Kelly, J. Miller, and S. Ruff. 2006. "The Globally Competent Engineer: Working Effectively with People Who Define Problems Differently," Journal of Engineering Education. 95(2): 107-122.
This paper addresses the concept of global competency for engineers and shows that key achievement in the often-stated goal of working effectively with different cultures is learning to work effectively with people who define problems differently than oneself. The authors also offer a minim set of learning criterion for the global competency of engineers and a set of three learning outcomes whose achievement can help engineers full this criterion.

Jowitt, Paul. 2008. Engineering civilization from the shadows. *Proceedings of the Institution of Civil Engineers.* 161(4) 162-168.
This paper discusses key issues, opportunities and obligations facing civil engineers

involved who must work to develop an infrastructure for the ever-increasing world population while working with the shadows cast by world poverty and global climate change. As the majority of the population increase is likely to be in urban slums in the developing world, the challenge is to help provide infrastructure to help protect this vulnerable population from disease, famine, drought and flooding.

Kabo J. and Caroline Baille. 2009. Seeing through the lens of social justice: a threshold for engineering. *European Journal of Engineering Education.* 34(4): 317-325.

The authors explore how students in a cross-disciplinary course on engineering and social justice approached the idea of using social justice as a lens for looking at engineering.

Nieusma, Dean and Donna Riley. 2010. Designs on development: engineering, globalization, and social justice. *Engineering Studies.* 2(1):29-59.

This article critically appraises engineering for development initiatives that are currently receiving a lot of attention within engineering communities in the U.S. and elsewhere in the world. The authors discuss how many of these programs share problematic assumptions about technology's role in community development and fail to grapple with the economic and cultural structures that influence most development interventions. The authors use a case study approach to highlight these assumptions, first by looking at a project involving a collaboration between universities in Nicaragua working on educational capacity building for product design with an eye to local economic empowerment, and the second involving the work of a non-governmental organization working in Sri Lanka and its approach to community development using renewable technologies.

Passino, Kevin M. Educating the humanitarian engineer. *Science and Engineering Ethics.* 15(4): 577-600.

The author outlines various strategies that can be used to augment the teaching of engineering ethics with the goal of encouraging engineers to serve as effective volunteers for community service. First, codes of ethics, moral frameworks, and comparative analysis of professional service standards lay the foundation for expectations for voluntary service in the engineering profession. Second, standard coverage of global issues in engineering ethics educates humanitarian engineers about aspects of the community that influence technical design constraints encountered in practice. Third, it is shown how extracurricular engineering

organizations can provide a theory-practice approach to education in volunteerism. Finally, long-term goals for establishing better infrastructure are identified for educating the humanitarian engineer in the university, and supporting life-long activities of humanitarian engineers.

Riley, Donna. 2007. Resisting neoliberalism in global development engineering. *114th Annual ASEE Conference and Exposition, 2007, June 24, 2007 - June 27, 2007.*

There has been an explosion of interest in global development engineering on university campuses, and numerous small-scale engineering projects have proliferated in developing countries, either driven by or with participation from U.S. engineers and engineering students. The author discusses the importance of the engineering community being aware of and participating in discussions around the underlying assumptions and values that accompany these trends, to learn how our efforts are (perhaps unwittingly) influenced by and even a part of them. In particular, at the heart of many development efforts lie economic and policy perspectives that are critiqued internationally and domestically as neoliberalism; as engineers learn about neoliberalism we can clarify our stances in relation to it as we undertake global development work. The author takes the position that engineers ought to resist neoliberal approaches to development that place ultimate faith in free markets and rely on what amount to "trickle down" theories to predict redistribution of wealth. The author explores models for engineering development projects and student participation in them, as well as potential pitfalls are examined, and the implications for global development efforts within engineering education.

Roth, W.M. 2008. Constructing community health and safety. *Municipal Engineer*. 161(2): 83-92.

Describes the factors considered and the decisions made by municipal engineers in Canada when a series of deadly E. coli outbreaks contaminated public water supplies in rural areas. A ten-year anthropological study reveals how municipal engineers routinely found themselves having to evaluate conflicting knowledge claims about the quantity and quality of water available, and to take into consideration often-conflicting constraints posed by the environment, economy, and social justice issues.

Sandekian, R. B. B. Amadei, A. Bielefeldt, and R.S. Summers. 2007. Engineering for Poverty Reduction: Challenges and Opportunities. *Fifth LACCEI International Latin American and Caribbean Conference for*

Engineering and Technology. Developing Entrepreneurial Engineers for Sustainable Growth of Latin America and the Caribbean. May 29-June 1, 2007. Tampico, Mexico.
Describes the Engineering for Developing Communities program at the University of Colorado at Boulder College of Engineering and Applied Science, and their goal of educating a new generation of engineers who can contribute to the relief of challenges faced by developing communities worldwide.

Singleton D. and N. Hahn. 2004. Sustainable poverty alleviation – changing role for engineers. *Proceedings of the Institution of Civil Engineering – Civil Engineering.* 157(Special Issue 2): 37-42.
Many volunteer engineers are involved with poverty alleviation in the developing world. The author argues that along with professional engineers collaborating to solve problems surrounding developing communities, the must also work with other professionals if long-lasting solutions are to be achieved. The author discusses a number of case studies showing how the sustained alleviation of poverty through implementation of infrastructure solutions also requires care attention to the underlying social, economic and political factors involved.

Tyler, Nick. 2006. Capabilities and radicalism: Engineering accessibility in the 21st century. *Transportation Planning and Technology.* 29(3): 331-358.
The author discusses how engineers need to consider how in some cases a person may be disabled by a lack of accessibility, how a person's needs challenge their capabilities (i.e., what they can do) and considers a radical approach to understanding people's capabilities in the implementation process. He suggests that engineers many need to look at the world in a different way before we can make it a better place.

VanderSteen, J.D. Hall, K.R. and Baille, C.A. 2010. Humanitarian engineering placements in our own communities. *European Journal of Engineering Education.* 35(2): 215-223.
Discusses a method of increasing interest in humanitarian engineering by having students participate in service-learning projects in their local communities, and the benefits of this type of program.

Notes

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Resource Type

Bibliography

Parent Collection

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Topics

Social Justice

Discipline(s)

Engineering