

Why Professional Practice

Riadh Habash

The ideal engineer is a composite. He is not a scientist, he is not a mathematician, he is not a sociologist or a writer, but he may use the knowledge and techniques of any or all of these disciplines in solving engineering problems.

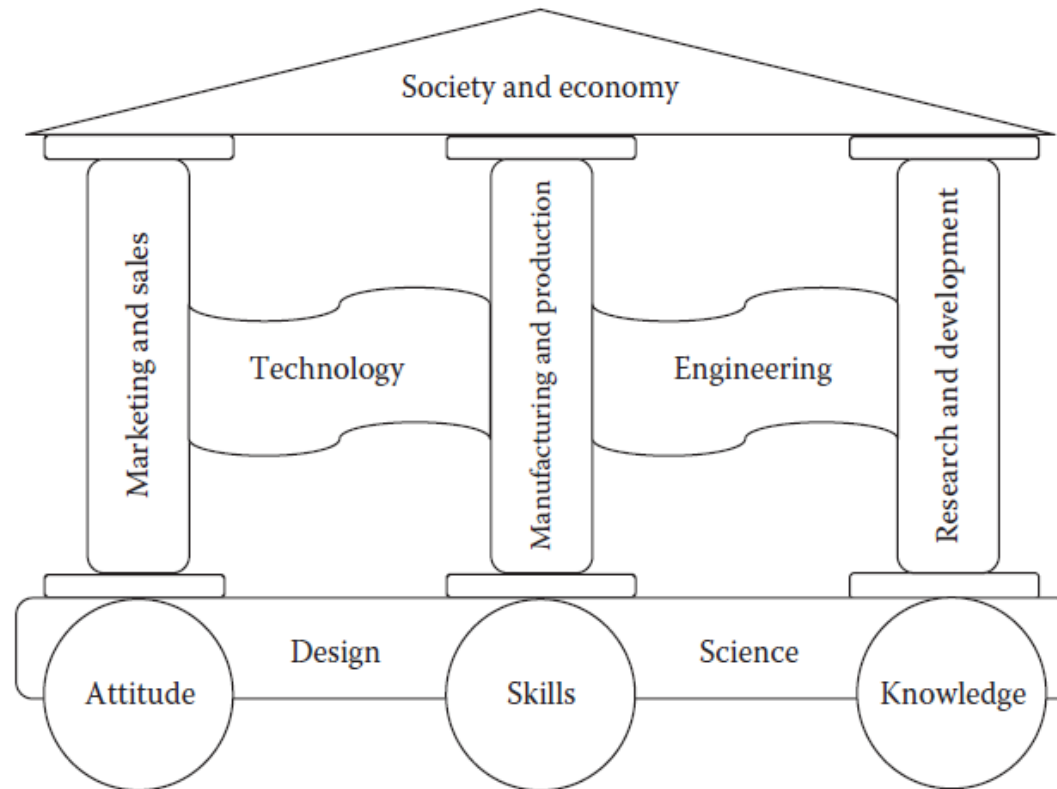
Nathan Washington Dougherty

Green Engineering: Innovation, Entrepreneurship, and Design

<https://www.routledge.com/Green-Engineering-Innovation-Entrepreneurship-and-Design/Habash/p/book/9781138035881>

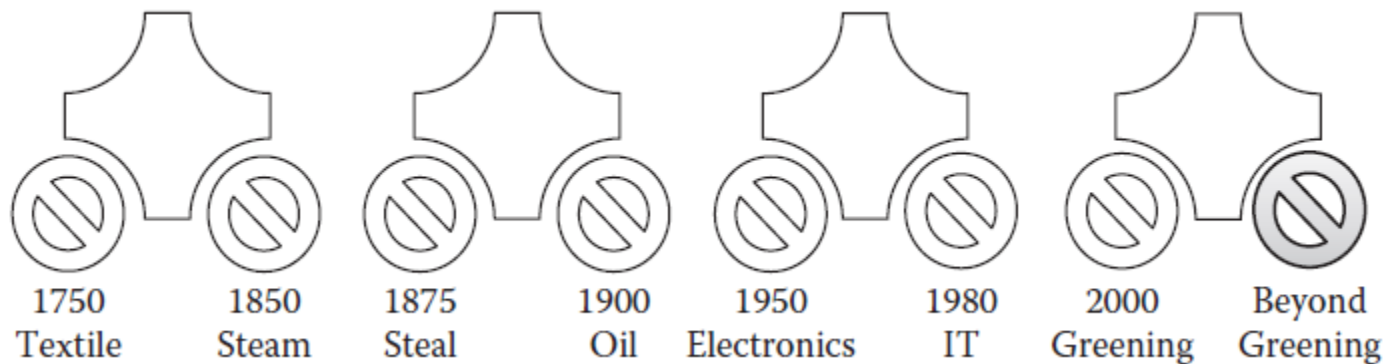
Convergence of Fields to Facilitate Transdisciplinary Engineering

The following model is indicative of the interactions that engineers must make and the languages they must learn to speak



Engineering Wheeling within Phases of Industrial Revolutions

Green Engineers are Great Engineers!



History is an Opportunity

- Facts of the past are a reminder that history is an opportunity.
- History provides a compelling perspective on the process of scientific discovery.
- Another way to look to the rich history of engineering innovations, both successes and failures, is to learn more about motivations.

Table 1.1 Opportunities along history

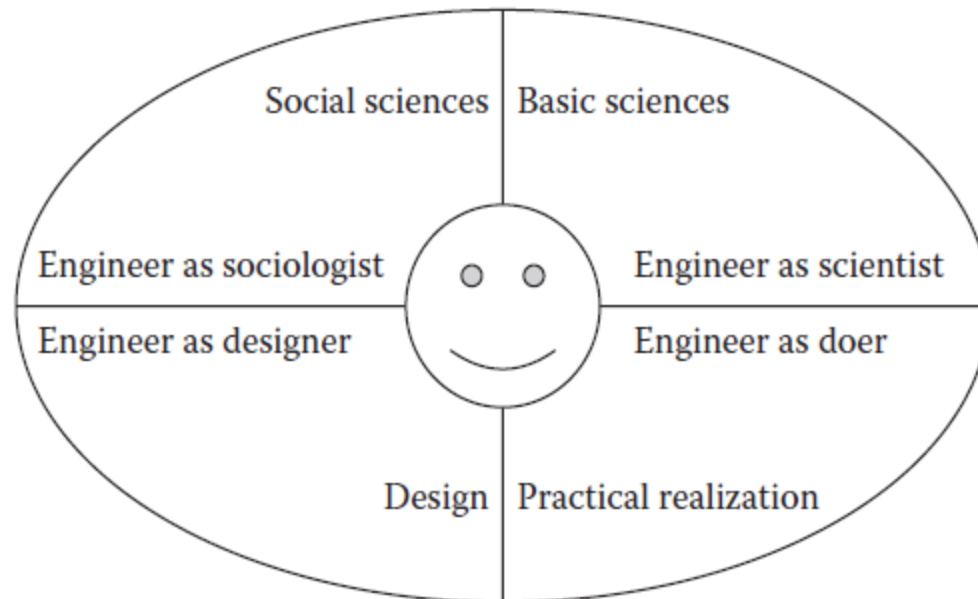
Early history	<i>Hunter</i> : First sign of survival and living using stone tools
10000 BC	<i>Grower</i> : Farming was the first source of income
AD 500	<i>Warier</i> : A way of creating value by taking goods of others produced
AD 1200	<i>Craftsman</i> : First signs to <i>be an entrepreneur</i>
AD 1500	<i>Explorer</i> : Came back with silks, spices, and other things
AD 1550	<i>Merchant</i> : Risk taker, the old entrepreneur
AD 1700	<i>Mechanizer</i> : Owning a machine became the next big thing
AD 1780	<i>Industrialist</i> : Industrialists became the big guys
AD 1900	<i>Oil Driller</i> : You are big if you discover oil
AD 1930	<i>Corporate Executive</i> : Being an executive was the best thing you could do
AD 1960	<i>Financier</i> : Being a banker became the best thing to do in life
AD 2000	<i>Entrepreneur</i> : IT lowered the cost of starting a company

The Four-dimensional Engineer!

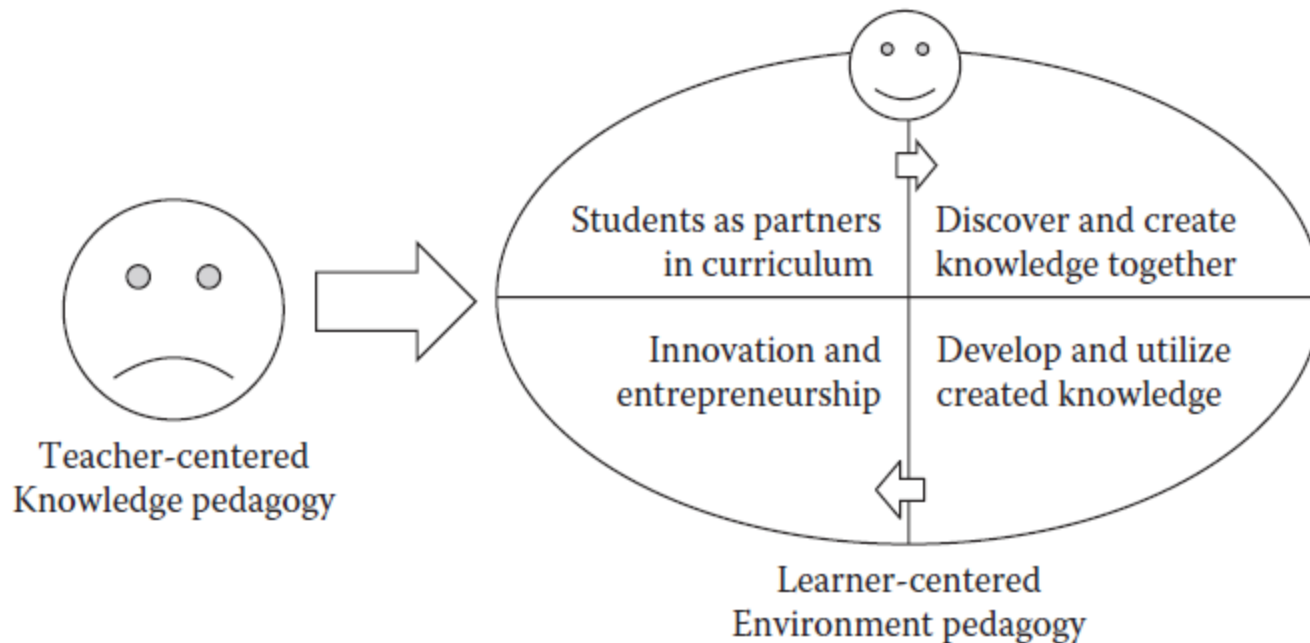
Understand the social, cultural, global, and environmental responsibilities of the professional engineer.

Understand the principles of sustainable design and development.

Understand and Commit to professional and ethical responsibilities.



Professional Practice Requires more than Technical Skills but an Innovative **Pedagogy** that Promotes Freeing **creativity**



Tell me and I forget, teach me and I remember,
involve me and I will learn
Benjamin Franklin

Student-controlled decision: Creating and influencing



Hybrid-controlled decision: Students having some influence



Tutor-controlled decision: Informed by student feedback



Tutor-controlled decision: No student engagement



Reflective Practice

- More than 50 years ago, Dean William L. Everitt wrote a visionary essay about educating engineers “in the future.” His future was 2012. His essay asserted that educating engineers means fostering innovative minds—the ability to create and navigate a world that, at any given time, we are only beginning to imagine.
- In this reflective task, research and propose a vision for future engineering practice based on understanding of the past. Your vision may be reflected in a form of logo, poster, video, simulation, animation, or any sort of innovative presentation.