PreK-12 Education Projects and Related Activities of the NAE

EDC Public Policy Colloquium

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Greg Pearson, Scholar

National Academy of Engineering

Context for K12 Eng. Education

Public understanding of engineering remains relatively low

Unlike science, math, and ELA, engineering is still not a regular part of the "core" of the K-12 education system

There is no well-defined professional pathway for "teachers of engineering" (e.g., very few university pre-service teacher education programs provide coursework in engineering)

Current K-12 teachers express very low confidence in their ability to teach engineering

Research suggests engineering-based instruction can boost student interest/achievement in S,T, M, but such "integrated" teaching and learning requires time and new pedagogy

Emerging Consensus on the "Big Ideas" in PreK-12 Eng

Design Process

- Constraints and specifications
- Modeling
- Analysis
- Optimization and trade-offs
- System(s)

Connections to S,T, and M

Habits of Mind

- systems thinking, creativity, optimism, collaboration, communication, attention to ethical considerations

Positive Trends/Forces of Note

Broadening interest in more "integrated" forms of STEAM in both K-12 and in UG (e.g., +CS, +humanities) education

Move toward more and earlier experiential learning in UG engineering

Adoption/adaption of NGSS by ~2/3 of states

Possible AP Engineering course

Educator Capacity Building in PreK-12 Engineering Education

Project Goal: Understand current and anticipated future needs for engineering-literate PreK-12 educators in the United States and how these needs might be addressed.

Work Plan: Literature review, landscape scan, workshops, consensus report

Current Status: Committee met late November; next meeting in mid-April.

LinkEngineering.org

Funded by Chevron

Three primary audiences:

- PreK-12 educators
- PD providers/pre-service educators
- School, district, state administrators

Research-based, iterative development process

Five partner organizations

22-member steering committee (Dean Pines!)

Collaboration with TeachEngineering

Enhancing Teachers' Voices in K-12 Engineering Education

Goal: Bring national attention to the value of involving classroom teachers in policy making related to the implementation of K-12 engineering education.

Convocation: Sept. 30-Oct. 1 at the NAS Building; ~100 attendees, majority classroom teachers

Products: Summary report and 3-4 targeted, companion "briefs"

Engineering Technology Education in the United States

Goal: Review status and history of the production and employment of engineering technologists and technicians in the United States

Recommendations

- **Nature of ET education**
- **Supply and demand**
- **Educational and employment pathways**
- **Data collection and analysis**

Report release: Feb. 15

Diversity in Engineering Technology Education

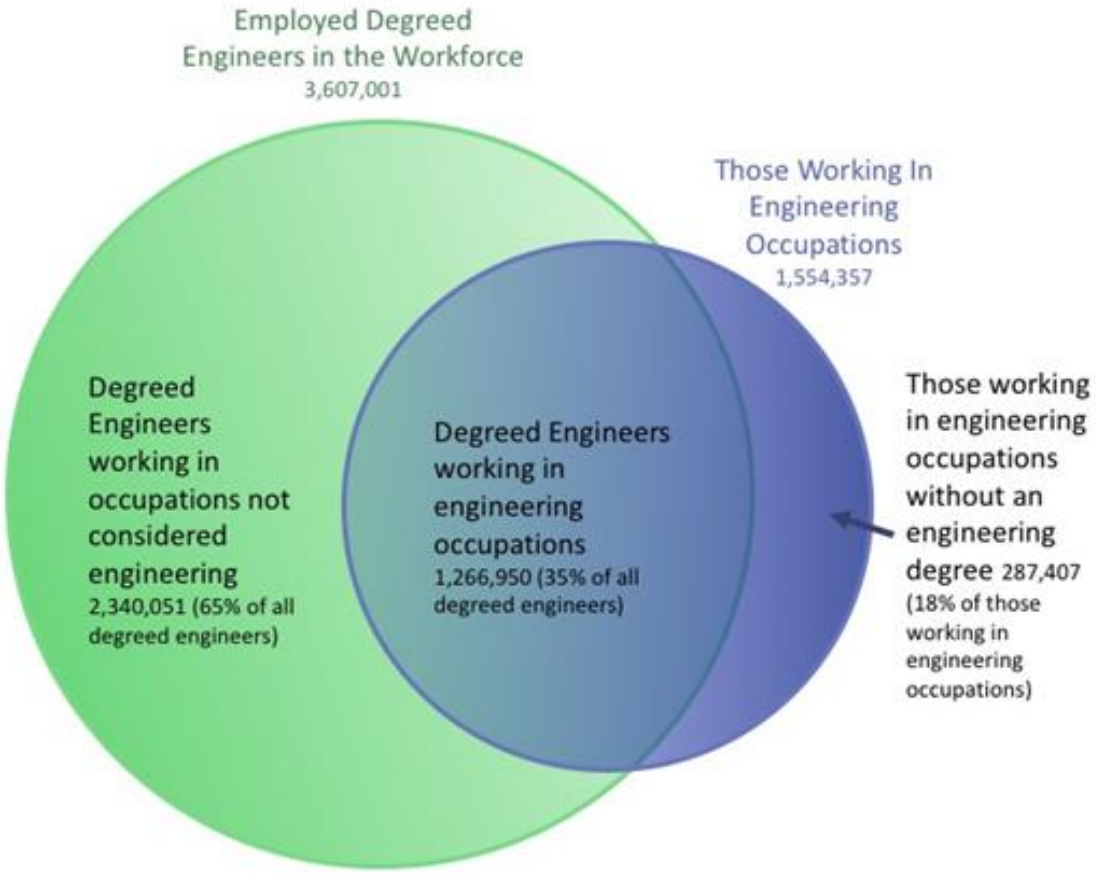
	US Pop.	4-Year Eng	4-Year ET	2-Year ET
Afr. Amer.	12.4	3.8	10.7	11.4
Hispanic	17.4	9.6	10.0	13.0
White	62.1	61.5	63.6	63.1

Understanding the Engineering Education-Workforce Continuum

Goal: Provide a systems view of the career pathways and related decision making of those currently working as engineers and those holding engineering degrees in the United States.

Potential Implications For: Broadening the value proposition for engineering

The Engineering Workforce



Professional Societies Engagement in UG Engineering Education

Goal: Understand the scope and nature of societies' UG educational activities and encourage collaboration. (Dean G. Washington on the planning cmte.)

- **Workshop held Jan 26-27 (Dean Pines keynote)**
- **Five regional meetings in the spring**
- **Proceedings to be published in summer 2017**

Tip o' the hat to EDC!

And Finally . . .

What should be the role, if any, of colleges of engineering in preparing PreK-12 engineering educators?

How can engineering colleges engage effectively with the NAE site, LinkEngineering?

Should traditional engineering programs work more closely with and learn from programs in engineering technology?

Is the fact that many engineering grads do not "do engineering" a positive or a negative for the engineering education community? For the country?

Thank You!

Greg Pearson
gpearson@nae.edu