Engineering Volunteerism

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Outline

- Volunteerism is required? for engineering professionalism
- Universities are responsible for development of the profession
- Educating the volunteer engineer is a university responsibility:
  - **Strategy 1: Expand ethics and professionalism treatment**
  - **Strategy 2: Hands-on volunteerism via a student organization**
- Relations to community-oriented design projects via service-learning *(another important strategy)*
- Infrastructure development for the volunteer engineer is a significant challenge

Strategy 1: Expand Ethics and Professionalism Treatment

- How to augment typical textbook treatments…
- Profession: "Pursuit of a learned art in the spirit of public service" (ASCE)
- Webster's Dictionary: "... a kind of work which has for its prime purpose the rendering of a public service."
- Public service is a critical part of being a professional!

Two routes to public service

- Employment + Service to Profession: Competence ("go the extra mile" to do good work), service to colleagues, service to profession, etc.
- Community service: Charitable organizations, disadvantaged groups, non-profits, educating public about profession, etc.
- Are both *required*? For the profession, yes?, <u>for the individual not always</u>.

Codes of Ethics

- Roles of codes? Ideals? Guidance?
- Role of "service" in codes, comparative:
  - **NSPE:** "Engineers shall seek opportunities to participate in civic affairs; career guidance for youths; and work for the advancement of the safety, health, and well-being of their community."
  - Others with *similar* statements: ASCE, ACM/IEEE Software Eng. Code
  - Others have *weak/no* statements: AIChE, ASME
  - **IEEE: Nothing with respect to the community!**
- We need changes!
  - ***Encourage*, support, set group expectations,...**
  - ***Must prominently state our ideals!***

Comparative professionalism

- AMA: “A physician shall recognize a responsibility to participate in activities contributing to the improvement of the community and the betterment of public health.”
- ABA: “... Every lawyer has a professional responsibility to provide legal services to those unable to pay. A lawyer should aspire to render at least (50) hours of pro bono publico legal services per year.”
- Is there a pervasive “pro bono” spirit in engineering???
  - Existing student volunteer activities (e.g., SWE, Tau Beta Pi, etc.)
  - Existing practicing engineers’ volunteerism (tutoring, etc.); identified as engineers? Do engineers view their services as essential?

Moral frameworks

- Utilitarianism, rights/duty ethics, virtue ethics all support volunteerism?
- Community-oriented version of self-realization ethics:
  - **Promote professional development via integration of work and personal integrity**
  - **Company supports engineer in service, engineer develops loyalty to company**
  - **Need strong corporate citizenship programs!**

Global Issues, World-Wide Communities…

- Community design constraints (must teach this!)
  - **Know needs of community, get community involved, use local talent**
  - **Appropriate technology, technology transfer, safety**
  - **Cost, maintenance, and improvement**
- Environment (sustainable development)
- Cultural exchange (efficiency vs. relationships)
- Globalization (learn about the competition)
- We need to educate “Global Citizens”

Ethics/professionalism assignments

- *Paper* design project (proposals) can be useful (e.g., scenarios that involve community design constraints, global issues)
- Research papers
  - **Corporate citizenship program assessment**
  - **Survey of engineering volunteerism projects**
  - **Assessment of professional codes of ethics**

Strategy 2: Hands-On Volunteerism Via a Student Organization

- OSU Engineers for Community Service (ECOS)
- Related organizations:
  - **Engineers without Borders, USA, Univ. Colorado, Boulder**
  - **Engineers for a Sustainable World, Cornell Univ.**
  - **Engineering Projects in Community Service (EPICS), Purdue University +**
  - **ETHOS, Univ. Dayton; Engineering World Health, Duke Univ.**
  - **Chapters + others…**
- Prime determinant of success - Students

Mission

- Engineers for Community Service (ECOS) promotes life-long professionalism via educational experiences in the uses of engineering skills for local and international community service projects.

ECOS is a College-Wide "Umbrella Organization"

- Advisory Board with faculty and staff
- Seminar series (e.g., service project examples)
- Multiple parallel projects in progress across College of Engineering:
- ECOS web: http://ecos.osu.edu/ for project descriptions
- Key challenge: High-tech vs. "grunt work"

Volunteerism project ideas

- Drinking water filtration, waste treatment (low cost, effective yet without adverse environmental impact)
- Agriculture (improve yield, irrigation)
- Low-cost housing (local materials, portability for refugees)
- Electricity generation, wind and solar power, solar cooker, lighting (renewable energy sources, low-cost solutions to basic needs)
- Computer technology (education support, career-development)
- Communications technology (promote democracy, market price information)
- Medical technology, telemedicine (promote healthcare access and quality)

Current Projects

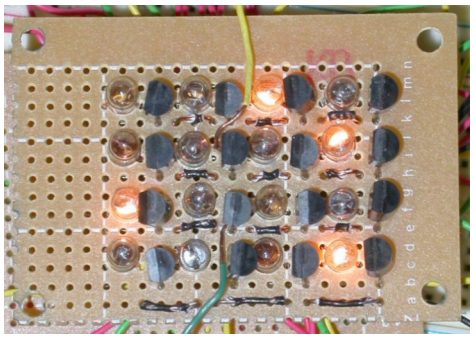
- Columbus/Domestic:
  - **Wonders of Our World (WOW): Science education for K-5**
  - **TechCorps, Ohio: Technology for disadvantaged schools**
  - **OSU FIRST robotics**
  - **Notre Dame Alumni Club Computer Software Education Project involvement**
  - **Explorer Post**
  - **Wheel-chair ramp project**

WOW program students

OSU engineering students with local high school students working on a robot

Current Projects

- International (completed):
  - **Low-cost laboratory development for higher-education**
  - **Casa de Maria y el Niño orphanage, computer donation and education, Medellín, Colombia (Summer 2004)**
  - **Design courses in low-cost housing and drinking water purification**

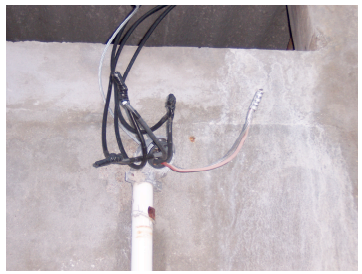


A low-cost control system experiment

Children at Casa de Maria

OSU Environmental Design Team takes first place at WERC competition!

- International project (Spring Breaks 05, 06):
  - **Montaña de Luz, HIV/AIDS orphanage in Honduras**
    - Pre-project trip completed Summer 2004
    - Web page
    - Electrical wiring
    - Administrative computers
    - Children's computer lab
    - Computer education
    - Assess communication problems
  - **Challenges…**



Children at Montaña de Luz

Relations to Service-Learning

- Ideas here useful for service-learning programs?
  - **Augmentations to ethics/professionalism education provide foundational theory and motivation**
  - **Can augment service-learning with pro bono spirit**
- Service-learning via design projects useful for educating the volunteer engineer?
  - **Yes, educate on similar topics (community-oriented design projects)**
  - **But, course credit destroys the spirit of pro bono service?!**
  - **Should service-learning be required? For capstone design?**

Educational Infrastructure, *Vision*

- Course needs (ethics, sustainable development, global poverty, science-technology-society, etc.), required service hours or service course?
- Service-learning program? Engineering volunteerism minor, designation on diploma, award?
- Faculty attitudes/involvement
- Office of Community Service
  - **Director and staff**
  - **Initiate and run programs, serve faculty for development of design projects, development, promotion**
  - **Interface to “corporate citizenship programs” in industry (teams?)**
  - **Help build “infrastructure” for the volunteer engineer**

Profession-Wide, Career-Long Infrastructure, *Vision*

- Infrastructure facilitates delivery!
- Professions (set ideals, support), need changes!
- Compare our infrastructure to doctors' and lawyers' (e.g., clinics)
- Government support?
- Industry support, corporate citizenship programs, can have a big impact. Let's demand it!

Concluding remarks

1. Claim 1: Individual (group) professionalism *is* (is not) possible without volunteer service to the community
2. Claim 2: Universities are responsible for development of the profession and educating the volunteer engineer
3. Claim 3: Critical need for infrastructure to support the volunteer engineer (university, industry, government)

- Talk based on:
  - **K. Passino, "Educating the Volunteer Engineer"**
  - **Paper at: http://www.ece.osu.edu/~passino/professionalism.html**

Final Challenge, Option #1:

- Provide a sound rationale for becoming a volunteer engineer, one that is likely to be able to convince anyone to get involved.
- Confront the critics, the issue of "good for them vs. good for me," "altruism/cooperation - greed/competition," and use at least one of the following perspectives:
  - **Religion(s)**
  - **Philosophy**
  - **Darwinian evolution, ecology, mathematics**
  - **Psychology, sociology**
  - **Economic theory, political science**

Final Challenge, Option #2

- Present arguments against performing engineering volunteerism. Consider the following:
  - **Impact on your employer (e.g., taking time from work duties)**
  - **Impact on your family (e.g., taking care of your children, grandparents)**
  - **Negative impacts on society (e.g., dependency, paternalistic service)**

Final Challenge, Option #3

- Better yet, consider both Options #1 and #2 and, for instance:
- Develop a policy for your company on engineering volunteerism
- Propose changes to the code of ethics of your professional society on how engineering volunteerism ideals should be stated