Exploring Engineers of the Future through EWB-USA Members

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Background: Future Engineers

- Calls to go back to roots of profession: civil servants
- Need for engineers to help solve global challenges
- Importance of new, broad skill sets & applications
Background: Benefits of EWB-USA

- Benefits map to ASCE BOK; helps to train a “new generation of engineers” Amadei & Sandekian 2010

- “Many EWB members are engineering evangelists who are passionate about their profession and who become role models for their peers, their juniors and their elders; they are also able to communicate engineering very effectively to the public. ... and they are able to work in a modern, inter-disciplinary manner with ease.” UNESCO 2010, p. 161

Background: Exploratory Research

Background: Research Methods

- Open-ended questionnaires: n=659
- Interviews & focus groups: n=165
- Pilot survey at CU: n=553
- Official survey to ASCE, ASME, SWE, EWB-USA: n=2,674

Objectives

How to recruit, educate, and retain engineers of the future

- Motivations & Personalities
- Engineering Education Experience
- Career Goals, Experiences, Expectations

Main Research Question:
How do EWB-USA and Non-EWB engineers differ?

- Interviews & focus groups: n=165
- Pilot survey at CU: n=563
- Official survey to ASCE, ASME, SWE, & EWB-USA: n=2,674
Survey Themes

Main Research Question:
How do EWB-USA and Non-EWB engineers differ?

- Engineering motivations
- Personality traits
- Community service attitudes
- ABET learning outcomes
- Student experiences
- Global experiences
- Engineering identity
- Needed career skills
- Career goals & experiences

Results: Survey Demographics

Survey Population: 2,674 engineers; 24% EWB-USA members

N=2,002
21% female
Avg. YOB: 1970
23% students

N=672
38% female
Avg. YOB: 1978
47% students
Slightly higher GPA's

All results significant at p<0.01
Results: ABET A-K Learning Outcomes

Q: Please rate your ability to do the following

- A: Apply math, science & eng.
- K: Use skills & tools in eng. practice
- D: Multidisciplinary teamwork
- I: Lifelong learning
- H: Understand impact of eng. globally & socially
- J: Knowledge of contemporary issues

Results: Student Experiences

Q: Have you had the following experiences within engineering?

- Project Completion
- Interdisciplinary teamwork
- Mentorship/networking
- Seeing social impact
- Facing ethical dilemmas
Results: Career Skills

Q: How much do you need/expect to incorporate the following skills in your engineering career?

- Technical skills
- Work in teams
- Awareness of impact
- PM skills
- Interpersonal skills
- Societal awareness
- Global perspective
- Networking
- Humanitarian emphasis
- Non-technical subjects

Results: Student Career Interests

Q: How likely is it that you will be doing each of the following?

- Teacher in eng.-related subject
- Engineering researcher
- Non-profit community dev.
- Engineering PM
- Public policy, government, law
- Professional degree
Results: Prof. Career Experiences

Q: Which roles have you been in since graduating?

- Eng. design or development
- Non-profit community dev.
- Public policy, government, law
- Not working full time by choice

Preliminary Conclusions

How do EWB-USA and Non-EWB engineers differ?
- More broad, professional skills and experiences
- More use of/expectation for broad skill sets in careers
- More interest & experience in broad careers
Moving Forward

- Continued analysis
  - Regression analyses to control for variables
  - Triangulate survey & interview data
- Dissemination of results
  - Participating organizations
  - Professional journals & conferences
- Future research
  - NAE study on graduate to workforce continuum (Is there a shortage? Where are graduates going?)

Thank you!

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Results: Student Career Goals

Mean Score from Definitely Not to Definitely Yes

EWB members  Non EWB Members

Results: Prof. Career Experience

% of Respondents

EWB members  Non EWB Members

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Results: Career Change

- EWB members
- Non EWB Members

% of Respondents

- ENG, DESIGN
- NGO COMM, DEV
- TEACHING ENG
- ENG, RESEARCH
- ENG, PM
- ENG, EX-MAN.
- MILITARY
- POLICY, GOV., LAW
- OTHER THAN ENG
- HOME BY CHOICE
- ENG, GRAD SCHOOL
- PROF, DEGREE
- NO CHANGE

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