Changing the Conversation About Engineering

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Recruiting Girls to Engineering

- Awareness – Limited
- Need relevant engineering examples
- Want well paying jobs that make a difference
- Want to create rather than build; discover, design, imagine, innovate and contribute
- Humanize engineering - Relate work to ppl [images] rather than mechanistic things
- Problem solvers essential to health, happiness and safety
- Stop reinforcing engineering as nerdy/boring
- Stop focusing on math & science inputs rather outputs career opportunities, make a difference

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because dreams need doing.
Changing the Conversation - Operationalized

Engineer Your Life (www.engineeryourlife.org)

Why Engineering?

1. Love your work, AND live your life too!
2. Be creative.
3. Work with great people.
4. Solve problems, design things that matter.
5. Never be bored.
6. Make a big salary.
7. Enjoy job flexibility.
8. Travel.
9. Make a difference.
10. Change the world.

Why & Engineers?
Meet Inspiring Women Find Your Dream Job Making It Happen

For Educators & Parents For Engineers
For Middle School Girls, Use EngineerGirl.org

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## Where ISU students go who leave STEM

### Top Five Destinations

#### Women
1. Psychology
2. Elementary Education
3. Marketing
4. Child and Family Services
5. Management

#### Men
1. Management Information Systems
2. Pre-Business
3. Finance
4. Management
5. Marketing
Understand That

• **Gender functions like culture** – boys and girls still develop different bodies of knowledge and experience; are acutely aware of different societal expectations and respond to differential reward structures.

• Anyone who finds themselves in a situation where they are greatly underrepresented will feel the **weight of representing ‘their kind’** i.e. stereotype threat.

• **Women** will generally ascribe difficulty with a task to internal characteristics (I’m not smart enough, I am a failure, I can’t learn this because I’m dumb, i.e. attribution theory) leading to lower self-confidence and depressed risk-taking.

• Women are strongly attracted to activities/careers that have a direct link to practical application and ‘helping’ others.

• Young women will ‘often ‘defer’ to young men when activities involve hands-on group work. This is not a symptom of disinterest but a reinforcement of the reward system they are growing up in (don’t be too aggressive, always be polite and defer to others, you don’t come first)
Factors influencing women in STEM

- Student Behavior
- Attitudes and Aspirations
- Academic Preparation
- Pre-College Education
  - Curriculum/Instruction
  - Teachers/Counselors/Peers
  - Learning Opportunities
- Family/Environmental Support
- Role Models

- Post Secondary
  - Structure and commitment
  - Academic & social climates
  - Special programs
Strategies
Recruitment Models of Success

- Messaging is important – impact on world/society
- Hands-on, interactive, multiple contacts
- Building self-esteem, confidence
- Role models – developing connections
- Family involvement
- Creating awareness, seeing possibilities
PWSE K-12 Needs Assessment

- Input from educators, parents, and 6-12 grade girls
- A few key findings:
  - Girls are least interested in learning about careers on-line
  - Girls have higher interest than participation in STEM related programming
  - Competing with athletics and music – top ‘extra curricular’ programming
  - Students confidence in STEM drops during high school
  - Parents and educators are not aware of resources available
  - Need more role models for girls
  - Many were interested in STEM summer camps
  - Weekend programming is least desired by students
Retention Models of Success

• Building community of support
• Mentoring (professionals, alumni, peers, etc.)
• Engagement of students: leadership, UG research, experiential learning, job shadowing, student organizations, etc.
• Study groups
• Setting realistic expectations, self-confidence
• Approachable, engaged faculty/staff members
• Personal encouragement
• Inclusive learning environment
Creating an Inclusive Learning Environment

• **Five general recommendations:**
  – Try to balance the curriculum by using units/activities/examples that appeal to men, women, people from different backgrounds, etc.
  – Be aware of differential knowledge and experiential bases of your students.
  – Be intentional in making a direct connection between the skills/concepts being taught and their practical application and impact on society.
  – Encourage young women to “sign up” in pairs and allow them to work together.
  – Set up competitive situations where the desired outcome is not person against person or one winner vs. losers, but is about coming up with creative solutions to a posed problem. This allows for many different endpoints and provides students with the opportunity to use their own knowledge and experience to develop creative solutions.

• **Tips for Engineering Classrooms:**
  – Participation
  – Leadership
  – Community
    • Brochure with 10 tips in each area -- will post on SharePoint

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Additional Resources

• Engineer Your Life  www.engineeryourlife.org

• WEPAN Knowledge Center www.wepanknowledgecenter.org

• CASEE – New Directions in Engineering Education booklets: career awareness, retention, advancement – of women in engineering www.caseeconduit.org

• Program for Women in Science and Engineering www.pwse.iastate.edu

• “Report to Iowa Legislature on Women and Minorities in STEM fields at Iowa’s Public Universities”, January 2009 www.iowamathscience.org/reports

• Equitable Classroom Practices Institute, Rice University www-bioc.rice.edu/precollege/ei/best_practices.html