Engineering Education: Women in Engineering and Misconceptions

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Women in Engineering

Purpose: To discover why there are so few females majoring in electrical and computer engineering and computer science

Scarcity of Women in Engineering

- Only 15.51% of admitted engineers in Fall 2006 were female (even less for those in the ECE department)
- Possible reasons:
  - Psychological
  - Physical
Psychological Reasons

Growth Mind-set (Males) Versus Fixed Mind-set (Females)

http://i137.photobucket.comalbums/q214/rborum/dweck_mindset-JPG.jpg
Physical Reasons

- Gender differences at a young age
- Lack of introduction to engineering classes before coming to college

http://www.iusb.edu/~cted/summer/img/Computer.JPG
Teaching Styles

- Teacher centered
  - Transferring
  - Shaping
- Student centered
  - Traveling
  - Growing

http://users.erols.com/interlac/teacher1.jpg
Learning Styles

- Motivation
  - Surface
  - Deep
  - Achieving
- Strategies
  - Surface
  - Deep
  - Achieving

http://www.youthchg.com/bulb3.jpg
Gender Differences

- Growth-intelligence view
- Static-intelligence view

http://images.inmagine.com/img/imagezoo/iz142/iz142030.jpg
Misconceptions

- Purpose of research:
  - identify misconceptions
  - find ways to fix these misconceptions
- Research began by reading scholarly articles
Algebra Word Problem Solutions: Thought Processes Underlying a Common Misconception

- Main idea:
  - Engineering students have trouble deriving algebraic equations from sentences
- Obvious application to a digital logic course:
  - Trouble with algebraic equations = trouble with Boolean logic equations?
Student Interview

- Observed an interview between a student and my mentor
- Interview setup:
  - Student answers questions selected by the interviewer
  - Interviewer listens to the student's responses, to identify misconceptions
While the student did remember some basic ideas from digital logic design, misconceptions arose.

Notable misconceptions:
- Boolean logic equation based on a statement
- Most of sequential logic
Conclusions

- The goal is to understand the student's thought process
- Calculation errors are not important
- Scholarly articles gave insight into:
  - How studies are conducted
  - Errors that apply in our research
The End

- Questions?
- Comments?