Gender and Self-Efficacy in End-User Programming – designing for diversity
Fears related to differences

- women offended by a “special needs” label
- are there any benefits from talking about differences?
- would talking about differences preserve stereotypes?
- what differences should we investigate?
- how do we know that we have covered them all? if it is at all important?
- but, what else should we do?

Benefits:
- we would at least know something, and be able to adapt to that knowledge
Kinds of differences to explore

- Technology has since long been considered male
- This association has influenced males as well as females as groups (not all individuals though)
- Studying how comfortable females and males respectively feel related to computer-based products could be of interest
  - are there differences to be found in this area?
  - is it possible to consider such possible differences in a specific design?
Inspiration from literature studies

• Margaret Burnett et al. (2011) focusing on Gender and end-user programming (several other papers published as well)
• task: debugging spreadsheets, correcting obvious bugs
• Two versions investigated in their main study:
  – High-support
  – Low-cost (supporting tinkering/playful experimentation)
• Why study tinkering?
  – a recognized way of learning new things
Possible gender differences in debugging

• do females and males tinker in the same way?
• do females and males use the same (kind of) features?
• do females benefit from a high-support interface?
• are males disadvantaged by a high-support interface?
• Research question:
  – How do gender, tinkering, self-efficacy, and effectiveness interact in end-user debugging?
Results Burnett et al. (2011)

- Females tinker with reflection
- Males tinker repeatedly, more rapidly and with less reflection
- Females slightly better results (in one study)
- Females’ self-efficacy drops both while tinkering and while getting high support, but much more so getting high support
- Males’ self-efficacy also drops a little bit with high support, but increases slightly with tinkering
Theories explaining the results

- females take *a comprehensive view*
- males choose the *most salient feature*
- males tinker more, but often without much thought
- females prefer *familiar features*, but when they tinker, they take the time to reflect
- self-efficacy (a person’s belief in his or her ability to perform a specific task) affects how well one succeeds
- in high-support, females might not have perceived tinkering as helpful for understanding, hence a drop in self-efficacy*
Alternative explanations*

- the drop in self-efficacy, related to a feeling of “special needs”?
- females: an obvious connection between their self-efficacy and how successfully they solved the task. Does feminist HCI has anything to offer explaining this?
- what is feminist HCI (Shaowen Bardzel)?
  – a feminist label usually means that it has to do with power and the relation between the genders
- the stereotypical view that anything related to computers is difficult for a female?
Self-efficacy theory

- Alan Bandura (1977, 1986, 1997 etc.), related to treating phobias
- Self-efficacy defined:
  - a person’s belief in his or her ability to perform a specific task
- Four sources of efficacy expectations
  - performance accomplishments
  - vicarious experience
  - verbal persuasion
  - emotional arousal
Design conclusions (Lena’s)

Designing for end-user programmers should support

• self-efficacy, inspired by Bandura. Benefits females in particular
• reflection (but how?), benefits males in particular
• tinkering probably a way forward
• willingness to try new features, make them feel familiar
• support the feeling that it is just playful exploration, not carving in stone
Dealing with stereotypes

• How do we avoid preserving stereotypes?
• don’t present the design as particularly designed for males or women, but rather designed for particular needs, for example
  – the need to reflect
  – the need for a supported self-efficacy
  – the need to feel that the session is just a draft

• see Schirmer, Hecht, Maass (2011) Inspiring Innovative Practice: Gender and Diversity as Key Factors in Software Migration Processes
  – a strategy to avoid the risk of preserving stereotypes
**Issues to discuss**

- how to approach gender & diversity issues?
  - should we continue looking for differences? which ones?
  - is focusing on needs and experiences fruitful?
- how do we transform the findings described in terms of actual design propositions?
  - reflection, self-efficacy, familiarity, tinkering
- how do we transform the findings into something to put in a G&D toolbox?
- more specifically, how do we interpret the fact that females’ self-efficacy dropped while using the high support version? The tinkering was the same as with the low-cost version.