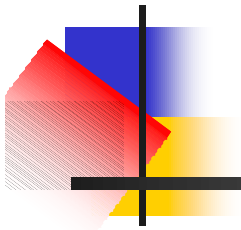# Handicaps to success for women engineers

Dr. Lemonia Ragia

Information Systems
Rheinisch-Westfälische Technische Hochschule
Aachen, Germany

Outline

I.   History of women engineers

II.   Main problems for women careers

III.   Suggestions for way out

I. History of women engineers

Athenian woman

the beginning is in the 18th century
the vast changes are in the 19th century
the first famous women engineers
in the 20th century

Theano about 6th century B.C. (ancient Greece)
the wife of Pythagoras
was a mathematician, a physician and an administrator

Hypatia of Alexandria (370 - 415)
The first woman mathematician and philosopher

Marie Curie – a role model scientist

Physics Nobel Prize 1903 and
Chemistry Nobel Prize 1911
first woman with Nobel Prize,
first person win two Nobel Prizes

Famous women scientists

Lise Meitner
Mother of the atomic bomb
Max Planck Medal

Augusta Ada Lovelace
as a pioneer in computing

Grace Murray Hopper
computer scientist
developing the first compiler and COBOL

Chien-Shiung Wu
First Woman President
of the American Physics Society

Many notable women engineers

- Mary Dixon Kies first patent for weaving of straw and silk
- Emily Roebling learned civil engineering ″on the fly″
- Gail Boydston chemical engineer developed new types of insulin
- Margaret Engels first woman with master in mechanical engineering
- Adele Goldberg as a pioneer of small talk and object oriented systems
- Carly Fiorina as a head of a big technological company

II. Main problems for women careers

A. Common problems that still remain for women engineers and come from dicsussions and experience

B. Empfasize some topics which do not motivate women for pursuing careers in engineering

1. Closed horizons

- Lack of information when they make academic decisions

- Changing often academic goals during schooling

- Hesitate to study math or science

- Live in communities which don't value schooling

- Awareness of career opportunities in technical fields
- No information about trends, conditions, study programs, existing fellowships
- Personal situation, middle class family, poverty, lack of communication with successful women, language barrier, low background in the family/society
- Limits in school related to the teaching material and staff

How can you expand your horizons?

- Participate in discussions?

- Watch TV?

- Surf in Internet?

As an example

2. Stereotypes

- Well defined professions for women
  - Hairdresser, secretary, ballet dancer, teacher, gynecologist
  - Choose a mother friendly job
- Standard pressure to choose the "normal" job
- Managing family and work
  - Loyalty to family means disloyalty at work
- Women engineers must act like men

- Preference to part time jobs
- Tradition still plays a big role
- Attitudes about women positions
- Gender stereotypes
  - Woman is "weak", "emotional", "submissive"
  - In childhood, girls play with dolls, boys play with trucks
- Social behavior and development

Typical statements

"typical woman"

"You have to act like a man"

"Better to stay at home for children"

"Get married"

"Be a teacher, you can work less hours"

"Don't be emotional be cool"

3. Limited ambitions

- Women are not supported to inflate their ambitions

- Risk should be avoided

- Preventing and blocking the ambitions

- Afraid not to be paid equally

- There is no motivation and support

- Lack of self confidence and self understanding
- We don't develop full potential
- We don't really know our goals and how to reach them
- Fear of the possibility to fail

What should I do?

thinking
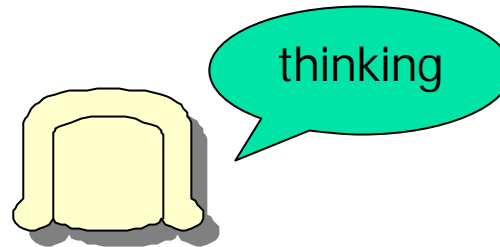
- What is better for me?
- I am not good enough in math, can I study?
- Perhaps I have to find a job after high school…

4. Parent family roles

- Daughters are supposed
  - to obey, clean the house, learn to cook, come back earlier
  - learn not to contradict the father
  - explain what they are doing
- Daughters
  - prefer not to be conflictual
  - may not be encouraged to continue their studies especially after failure
- Traditional role in the family
- We don't play an economic role in some societies

- In the parent family
  - different expectations for sons and daughters
  - different limits on sons and daughters
- Images showing motherhood are emphasized
- There are not always the same education and possibilities
- Financial problems to support all children
- Decisions are made in the enlarged parent family

Daughter observes and feels

Don't listen to anybody choose your own path!

5. New family roles

- Women supposed to be good in family
  - Cooking, cleaning, organising, have household tasks
  - Good wife and great mother
- They play a key role in the new family especially for the children
- Still retain the main role of child bearing

- There are conficts that bring stress and discourage
- There are social patterns women can not avoid
- Stay at home for raising children for some years means actually unemployment
- Higher level of education usually means sacrifices in having children
- In a competitive world companies avoid as key employees women with children

The new role as a mother


It trades with professional commitment!

6. Absence of networks and clusters

- Not so many women in management positions
- Few successful women in companies
- Absence of national and international networks
- Absence of influence and limited opportunities to have contact with successful women
- Lack of women based business associations

- Clusters can be defined as
  - Women that work in a sector private or state
  - Women that came from the same subject, e.g., chemical engineers or civil engineers
  - Women that live in the same country
  - Women with common characteristics, e.g., same university, same experience
  - Professional relationships, common interests

How can we create clusters?
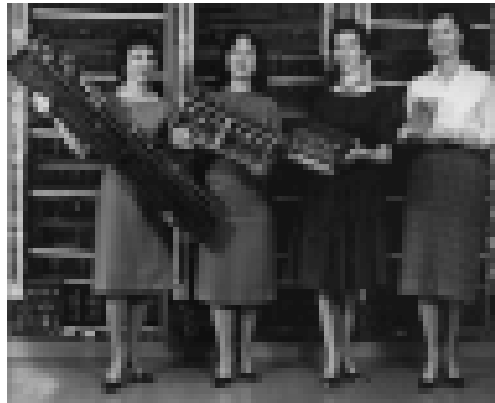
Devote some time and don't miss opportunities

Be a joiner

7. Sentimentality

- Women are supposed to be emotional, a handicap for management
- Are better in personal relationships, difficulty in lateral moves
- Usually show their emotions, it is interpreted as a weakness
- Avoid conflicts and hurting people, it is interpeted as difficulty in decision making

- Women take thinks personally, it clouds their clear thinking
- Seek friendships and discuss their personal problems, this gives opportunity for attack
- Unhappiness at home feeds to lack of concentration in the professional environment

Sentimental is not bad but sometimes you have to be hard

Arguments against women engineers

- They cannot function in a man's world
- They cannot take hard decisions
- They are too emotional

8. Appearance standards

- Women are supposed to be:
    - Elegant but not overdressed
    - Nice looking but not overly beautiful
    - Womenlike but not sexy
    - Not too aggresive but not submissive
    - Sportly but not overly muscular
    - Friendly and smiling but not too close

- The allowed window for proper behaviour is much smaller for women than for men
- Women are closely watched and any error is registered, discussed and used against them

Appearance in not everything!
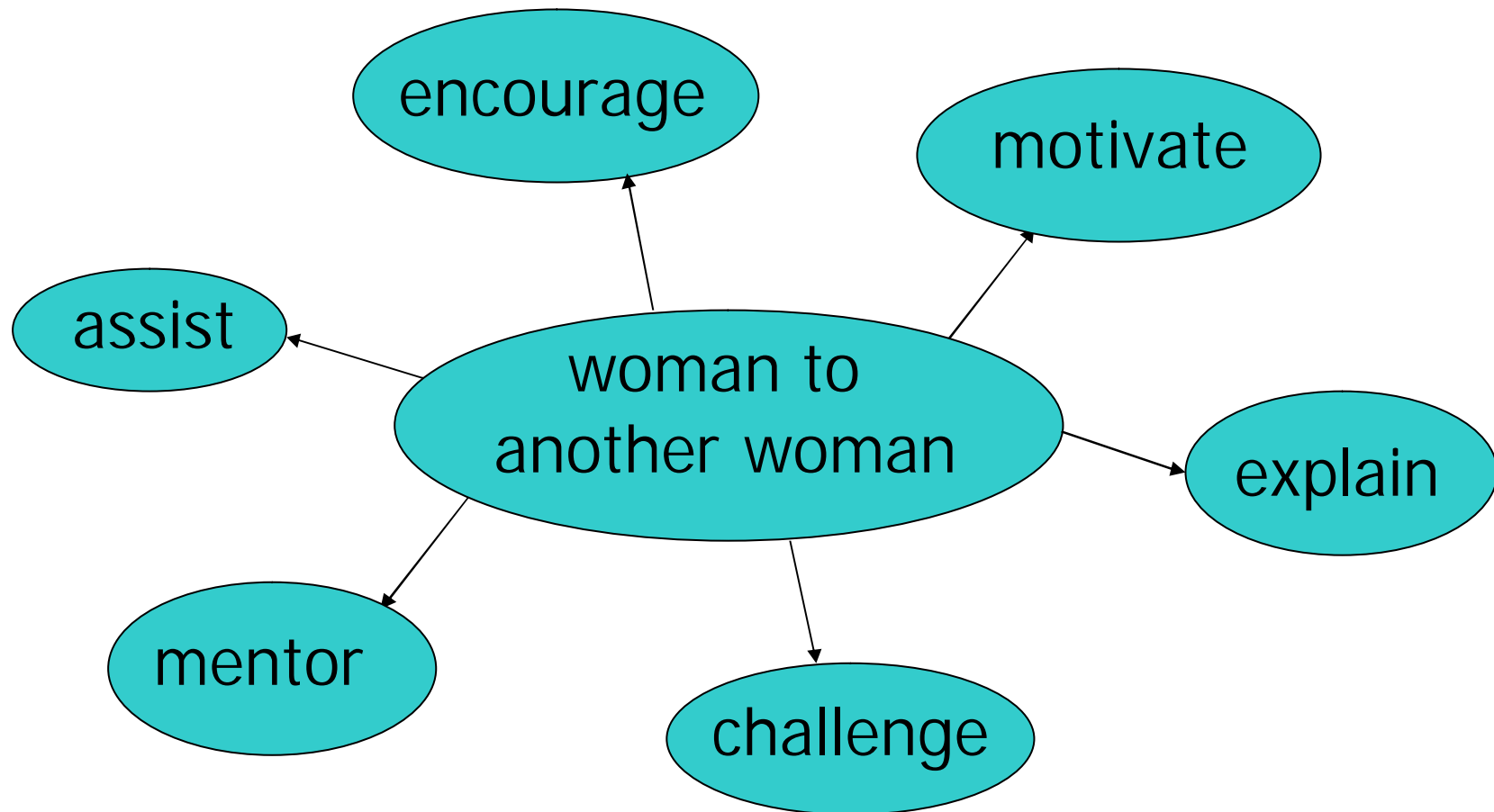
What if you are not extra good looking

?

Be comfortable and project a winning image

!

III. Suggestions for way out

1. Don't count on laws and regulations
2. Don't expect any miracles
3. Build clusters and networks
4. Accept help graciously
5. Need a mentor at every step
6. If unsuccessful change the game
7. Never give up

You cannot change the society patterns but

you can take concrete steps to help you overcome the difficulties

and help other women on the way!