Information Technology (IT)
PBL+CSE= ?

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200 km South of Stockholm
1.5h flight from Amsterdam
1h flight from Copenhagen
About us...

- 26000 students, 10000 in Engineering faculty
- One of the largest computer science departments in Northern Europe
- Sizeable group of researchers in AI, natural language processing, software engineering, security, theoretical computer science, embedded and real-time systems
Pioneer in computer education

- First Computer Engineering program in Sweden
- First Computer Science program in Sweden
- First programs in Information Technology (IT), Cognitive science, Innovative programming...
Pioneer in PBL

- Studies in Medicine since 80’s
- Several other educational programs in health sciences, psychology, pedagogy, environmental sciences, …
- First engineering program (IT) since 1995
Organisation

- Degree programs organised at faculty level

Board of education in Computer and Media technologies

Dept. of CS
Dept. of EE
Dept. of Maths
Dept. of physics, …
Responsible for 13 programs

- Three 5-year programs
  - Computer science and engineering (90 students)
  - Media Technology (60 students)
  - Information Technology (30 students)

- Four Bachelor programs
  - Computer science, Graphic design and communication, Innovative programming, Computer engineering

Plus 5 Master programs, 3 of which International
Why PBL?

- LiU keen on innovation in education
- Industry demands engineers that
  - Learn to learn
  - Can cooperate, are good in communication
  - Have a holistic perspective in problem solving
Our premises

- "Problem" as a base facilitates integration of technical and humanities topics
- Attractive for students, mimics life in industry
- Holistic perspective attracts female students

Should not cost more 😊
Our implementation (Anno. 1995)

- First three years entirely PBL-based
- Several courses specially designed to integrate several topics, e.g.
  - Real-time systems and automatic control
  - Data structures, algorithms and optimisation
- Communication a recurring red thread
Highlights

- Students meet in a group twice a week
- Problem discussed in group, learning done individually – with individual learning goals
- Lectures do not cover all material
- Literature list: student selects according to need
- Ethics, Gender studies, Psychology,...obligatory!
Tutorial groups

- Fixed for each semester
- Led by tutors that are
  - not experts in all topics
  - Do not intervene at the content level but at the process level
- Group composition promotes variation
Content integration

- Cooperation across departments
- Technical and non-technical
- LARGE courses, e.g. Project-based whole semester course with 30 ECTS points
  - Had students from economics and psychology studying together with our IT students
Experiences – first 10 years

- Mathematics a major challenge
- Integration of topics requires keen teachers
- Alternative examination forms demanding
- Best outcomes:
  - 5th term, whole term project-based
  - Courses with those teachers positive to PBL
Observations

- Motor for renewal in all programs
- Introduction of Java, new lab environments, etc
- Students “live” together, have a “nice” social environment, fewer fallouts
- Very attractive in industry
Post.com

- IT as attractive as before?
- Is PBL working in reality?
- Are more students seeking the program?
- Are women attracted to the program?
- What is the difference with the main 5-year CSE program anyway? Same content?
Rethinking 2007

- Program with a special profile from year 1: Communication, Networks and Security
- Courses integrate topics to a lesser extent
- Roughly 50% of courses use PBL
- Rest: students read together with CSE
Highlights

- First group in year 3 now, “Mathematics phenomenon” seems to appear for “Programming”
- 5th semester: Project still very attractive
- Mobile handheld devices for disaster management
- 6th semester: Pioneer in Green computing
Wrapping up

- Recruitment not much better than our 5-yr CSE degree
- Slightly higher % of women
- Very high student satisfaction
- PBL: never to be taken for granted, continuous teacher education, stimuli, development...