Welcome to the 1st NMI Seminar

Laboratory Teaching

- How to answer students’ questions (Anna)
- How to give feedback on students’ reports (Juha)
- How to use lab lectures (He)
- Open discussion
- Upload the seminar results

Introduction

- Why labs?
  - Stimulate learning processes
  - Teach the students how to learn
- Stimulate creativity and independent thinking
- Give a greater understanding of the theory

Learning by Doing

- Combining theory and practice
- Difference between knowing how to do something and actually being able to do it
- Example: sports, programming etc.

Answering Questions

- Generally: Give answers such that...
  - The students have to think for themselves
  - The work can progress
  - Don’t give away the whole solution
- Let’s look at some example situations...

Answering Questions – Example 1

- Ex1: The students need help to get started with a new lab or new tool
- Point the students to recommended reading
  - Course literature
  - Lab instructions
  - Course homepage
  - How-to manuals etc.
- Give help related to technical difficulties (students not familiar with UNIX etc.)
**Answering Questions – Example 2**

- Ex2: The students are stuck and want you to solve the exercise for them
- Ask them what they have done so far (explaining might naturally lead them to an idea of what to do next)
- Ask questions related to theory – recommend reading
- If the problem is not directly related to the lab (syntax errors, environment issues) – give hints/help

**Remember**

- There are no stupid questions
- Treat the students equally
- Don’t give away too much hints…
- …but give enough help for the students to continue.

**References:**

A. Hofstein, V. Lunetta, "The Laboratory in Science Education: Foundations for the Twenty-first Century"

John Dewey, founder of the term "Learning by doing"

**Giving feedback to students on reports, labs and reaction papers (Swe. reflektioner)**

- **Who?**
  - supervisor (advisor, tutor)
  - peers (other students, colleagues)
  - reviewer
- **When?**
  - when agreed upon
- **How?**
  - in written form: structured e-mail, comments in pdf, comments in printed report
  - orally
- **Why? (see next)**
- **What? (later)**

**Why feedback?**

- part of learning process
- assessment of understanding
- develop skills
  - analytical ability
  - writing
  - learning
- integrate new knowledge with previous knowledge
- provide a better picture of what is expected in the course

**What type of feedback?**

- contains evaluations within the “field’s accepted standards of judgement”
- should be fair, i.e., keep it to the specific tradition within the field
- examples, different types of feedback in different fields:
  - humanities: “interesting” arguments
  - social sciences: the methodology
  - natural sciences and engineering: the results and their implications

**What type of feedback? (cont’d)**

- labs
  - solved problem correctly?
  - understood the problem/solution?
  - smaller errors: discuss orally!
- reaction papers
  - personal expressions?
  - makes use of own experience?
  - references course literature?
What type of feedback (cont’d)

- report
  - audience?
  - purpose?
  - problem to be solved (with motivation)?
  - conclusions?
    - evidence
    - valid/feasible
  - important assumptions?
  - contribution?
  - all parts there?

Constructive feedback

- construct what?
- balanced
- if negative, give suggestion for improvement
- dialogue

How to use lab lecture

- Lab lecture
  - 2 lab lectures in Database normalization + EER diagram
  - between lecture and lab
    - repeat, and in detail
    - discuss relevant confusion students have in lectures
  - point out the goal of labs
  - connect theory to labs

“You have to be more organized than you realize”

- Are there materials for the lab lectures?
- Does each lab assistant use the same materials?
- What do we expect students to do before the lab lecture?
  - give them exercises during the lecture
    - do students already see the problem and/or feel confused?
  - ask them to do exercises before they come to the lecture
    - bring up the common mistakes

“Prepare to repeat the difficult/important theories

- Introduce the lab lecture
  - state what you will be doing, and how it fits into labs.

Summarize

- finish the lab by reviewing what students should have learned, and previewing the work for the labs.

Discussion

- Treat students as they need
- Remember that lab assistants are the connections between students and course leaders
- Act as a teacher, not a student any more
- By asking students questions to teach students
- Time boxing