



Welcome to the 1st NMI Seminar

Laboratory Teaching

NMI Presentation, IDA, ADIT
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LiU
expanding reality

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 be able to do it
- Example: sports, programming etc.



*Just because you know in theory how it works,
it doesn't mean that you don't need to practice.*



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)

- | | |
|---|--|
| <ul style="list-style-type: none">Who?<ul style="list-style-type: none">supervisor (advisor, tutor)peers (other students, colleagues)reviewerWhen?<ul style="list-style-type: none">when agreed upon | <ul style="list-style-type: none">How?<ul style="list-style-type: none">in written form: structured e-mail, comments in pdf, comments in printed reportorallyWhy? (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)

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



Constructive feedback

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



How to use lab lecture

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



"You have to be more organized than you realize"

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



"You have to be more organized than you realize"

- n Prepare to repeat the difficult/important theories
- n Introduce the lab lecture
 - q state what you will be doing, and how it fits into labs.
- n Summarize
 - q finish the lab by reviewing what students should have learned and, previewing the work for the labs.



Discussion

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

