Purpose of lab

- Apply concepts from Theory of science.
- Get a feel for
  - how qualitative research can be performed
  - what kinds of results it can offer.
- Discuss differences and similarities between positivistic and non-positivistic research.
- Get a new perspective on "object" and "class"

Lab task

- Analyse how students perceive the concepts of "object" and "class".
- The study should consist of a phenomenographic analysis of excerpts from interviews.

Idag

- Labben, syfte
- Var passar fenomenografi in i ett intellektuellt landskap?
- Vad är fenomenografi?
- Hur gör man en fenomenografisk studie, framförallt en analys?
- Labben
- Vad säger resultaten?
- Sammanfattning

Questions to consider during lab

- What is research?
- What is evidence?
- What is the role of the researcher?
- To what extent is the researcher present in the results?
- What is non-positivistic research?

What does it mean to learn something?

Unfortunately (?)….

- General case: A “meaningless” question
- It all depends on “what you mean by learning” or “how you see things”
A research approach/methodology/framework

- Offers a way to perform research in learning.
- Organizes "ways to see things".
- A lens with a certain focus.
- With a specific research approach: Some issues get clearer, others blurred.

Research frameworks within learning

**Quantitative**
- Quantitative results
- Observable variables, "hard" evidence
- Social environment constitute an objective reality
- Experiments
- The "science method"
- Positivistic research

**Qualitative**
- Descriptions
- Interpretations, researcher is present
- Social environment is constructed
- Studies in naturalistic settings
- Non-positivistic

Idag

- Labben, syfte
- Var passer fenomenografi in i ett intellektuellt landskap?
- Vad är fenomenografi?
- Hur gör man en fenomenografisk studie, framförallt en analys?
- Labben
- Vad säger resultaten?
- Sammanfattning

So, what is phenomenography not? And what is it?

- Phenomenography does not discuss the nature of the world, if something exist "in reality" or not.
- That is, phenomenography is not about ontology
- Instead, phenomenography is way to approach pedagogical research.
- That is, phenomenography is a methodology aiming to gain knowledge about how students understand something

What is phenomenography?

- Describes learning and understanding from the learners’ perspective
- Aims at analysing and describing the different ways in which students’ understand something.
- Discusses learning in a collective.
- Outcome: A few qualitatively different ways, in which something is understood within a student cohort.

Phenomenography

The students study OOP

The researcher studies the different ways in which the students understand OOP

The researcher is a learner in relation to his study object

The researcher shapes and becomes a part of the results

Example: The concepts of "class" and "object"; the role of the teacher
Examples of phenomenographic results

- How do students go about programming? (Booth, 1992)
  - Expedient: Cut-and-paste
  - Constructional: Build from examples
  - Operational: “It works”
  - Structural: Underlying structure

- What is a computer network protocol? (Berglund, 2002)
  - A way to communicate between two computers.
  - A method for communicating on an internet.
  - A set of rules.
  - A standard.

How do we do phenomenography?

1. Formulation of the research question (What do we want to know?)
2. Data Collection (Often collected through interviews)
3. Analyses
4. Deploying the results (Use the insights in the teaching)

Analysis

- Read transcripts
  - Do not assign values
- Cut out relevant parts
  - Do not study quotes/transcripts in isolation.
  - See the individual against the many
- Sort in piles
  - What does a pile tell me? Nothing
  - Does this fit with the whole? No
  - Is there a structure between the piles? No
- Hints
  - Aim for 2-5 categories
  - Remember that the categories do not describe individuals. That is, one individual can “appear” in many categories.
  - Make sure you can verbalise the research question as well as the categories
  - Go in a dialogue with data
  - Remember that you are a part of the results.

Uppgift

- Du får 29 intervjuutdrag. Gör en fenomenografisk analys, exempelvis på “studenters uppfattning om objekt”, “studenters uppfattning om klass”, “har det gått till att lär OOP”, eller något annat relevant ämne som data inbjuder dig att studera.
- Arbeta 2-3 personer.
- Du använder säkert inte alla utdrag.
- Data kommer från en studie vid en civingutbildning på UU.

Lab-tid

- NU!

Literature

- Marton & Booth, 1997
- Eckerdal & Thuné, 2005, available from GP page
- Eckerdal & Berglund, 2005
- Berglund & Wigberg, 2005, available from GP page
- http://www.ped.gu.se/biorn/phgraph/welcome.html
The concept of “object” (Anna Eckerdal)

1. Object is experienced as a piece of code
2. As above, and in addition object is experienced as something that is active in the program.
3. As above, and in addition object is experienced as a model of some real world phenomenon.

Cat 1. Object is experienced as a piece of code

1. C: I imagine that it is a piece of the code with all the variables piled under.
29. I: How would you explain what an object is to a friend?
N: I’d just say that it is a part of the program.

Cat 2. Object is experienced as a piece of code, and as something that is active in the program

19. M: the object is a kind of, what is doing something [...] because it is all about that something is going to happen.
26. K: If you think of the Java program, that it is built of different objects and it is the objects we modify so that we can get what we want from it.

Cat 3. Object is experienced as a piece of code, and as something that is active in the program and as a model of some real world phenomenon.

9: C: Yes an object, you can have a rather physical image of it...
I: What did you say, physical?
C: Kind of, you can think of a car and then it has one variable for how many wheels it has, one variable for the size of the engine like that.

The concept of “class” (Anna Eckerdal)

1. Class is experienced as an entity in the program, contributing to the structure of the code.
2. Class is experienced as a description of properties and behaviour of the object.
3. Class is experienced as a description of properties and behaviour of the object, as a model of some real world phenomenon.

Cat 2. Class is experienced as an entity in the program, and as something that is active in the program

19. M: the object is a kind of, what is doing something [...] because it is all about that something is going to happen.
26. K: If you think of the Java program, that it is built of different objects and it is the objects we modify so that we can get what we want from it.

Cat 3. Class is experienced as an entity in the program, and as something that is active in the program and as a model of some real world phenomenon.

9: C: Yes an object, you can have a rather physical image of it...
I: What did you say, physical?
C: Kind of, you can think of a car and then it has one variable for how many wheels it has, one variable for the size of the engine like that.

What is a “phenomenographic outcome space”?

It describes the different ways, in which a phenomenon is experienced in a cohort.
It describes the different ways, in which a researcher has interpreted how a phenomenon is experienced in a cohort.