HUMBOLDT UNIVERSITY BERLIN
DEPARTMENT OF COMPUTER SCIENCE
SOFTWARE ENGINEERING GROUP

On a Cooperation Project with Engineering Psychologists - A Teaching Perspective

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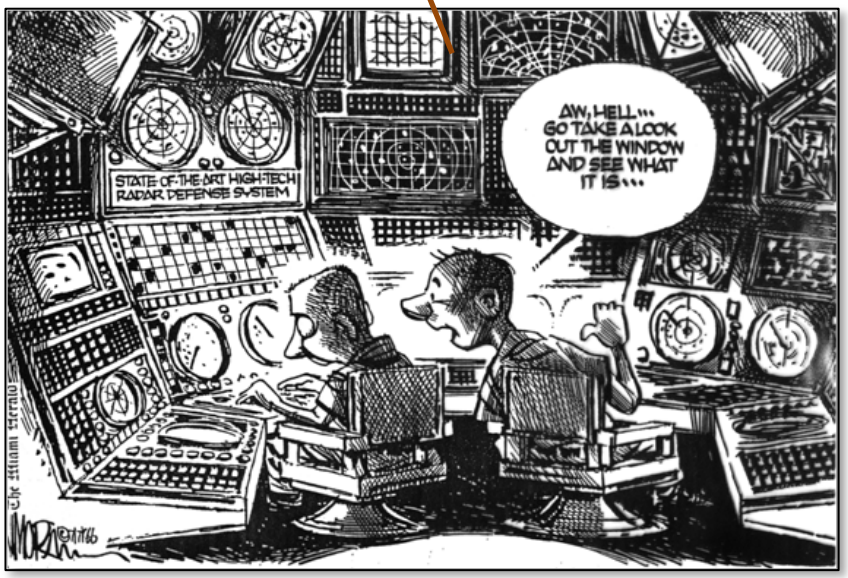
Agenda

- **the project behind: ATEO**
  - research background
- **starting point**
  - situation in 2007/ 08
- **resulting seminars / theses**
  - hold seminars & their results
  - contributions of students in their graduation works
- **summary**

Tracking, Operators & Machines (Automatics)

typical tracking task
(dynamic process)

Operators
(supervision & control)

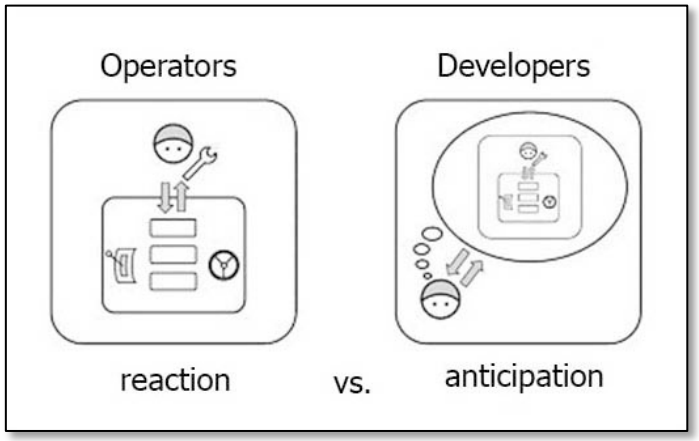


Automatics
(supervision & control)

The Project ATEO

- **A**rbei**t**steilung **E**ntwickler-**O**perateur (ATEO)
  - Division of Labor between **Developers** and **Operators**

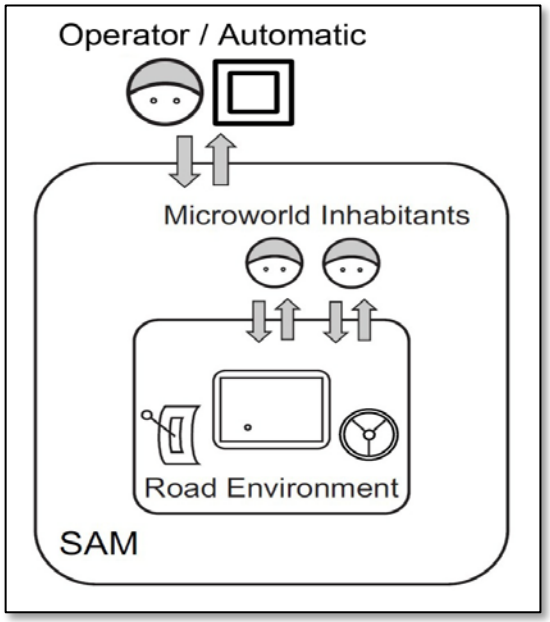
- **operators / automatics**
  - **supervise and control** a dynamic process, i.e. **react** the occurring events
  - operators by using operator panels
  - automatics **without intervention** by humans



- **developers**
  - develop **Human-Machine-Systems** for **automation**
  - **anticipate** the occurring events (including special cases)

- **research objective**
  - Which tasks should be performed by humans?
  - Which tasks are better performed by automatics?

Central Concept: SAM



- **Socially Augmented Microworld**
  - models a **dynamic process** which is to be **supervised** and **controlled**
  - **dynamic process**
    - **tracking task** performed by **Microworld Inhabitants (MWI)**
    - **objective** is to be as **fast** and as **accurate** as possible
  - **operators / automatics**
    - **support the MWI** to maximize their **performance**
    - by **supervising & controlling** the tracking

Situation in 2007/ 08 (1)

- **SAMs**
  - Implementation of SAM using **Smalltalk / Squeak (EToys)**
- **ad hoc development since 2004**
  - no requirements engineering
    - i.e. no requirements specification
  - no quality assurrance
    - no test cases, sparse documentation, no guidelines, metrics, …
  - no architecture design
    - historically grown architecture …

Situation in 2007/ 08 (2)

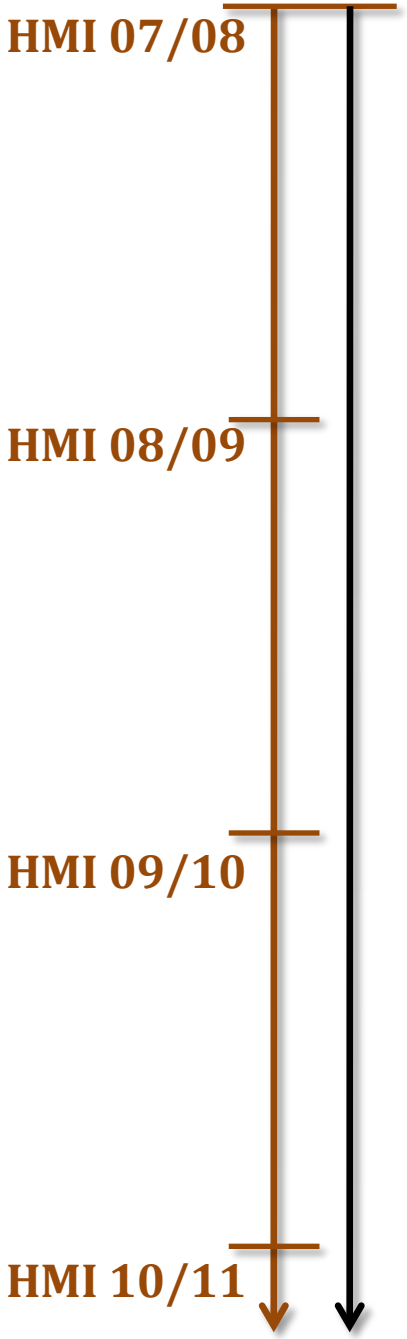
1. **lack of information**
   - **software quality** only vaguely known
     - high **costs** for
       - new features /changes
       - bug fixing
     - decreasing **performance**
     - but **no detailed** information
   - **architecture** unknown
     - especially **dependencies** unknown

2. **lack of functionality**
   - **further software components** requested
     - ATEO Master Display
     - ATEO Automation Framework

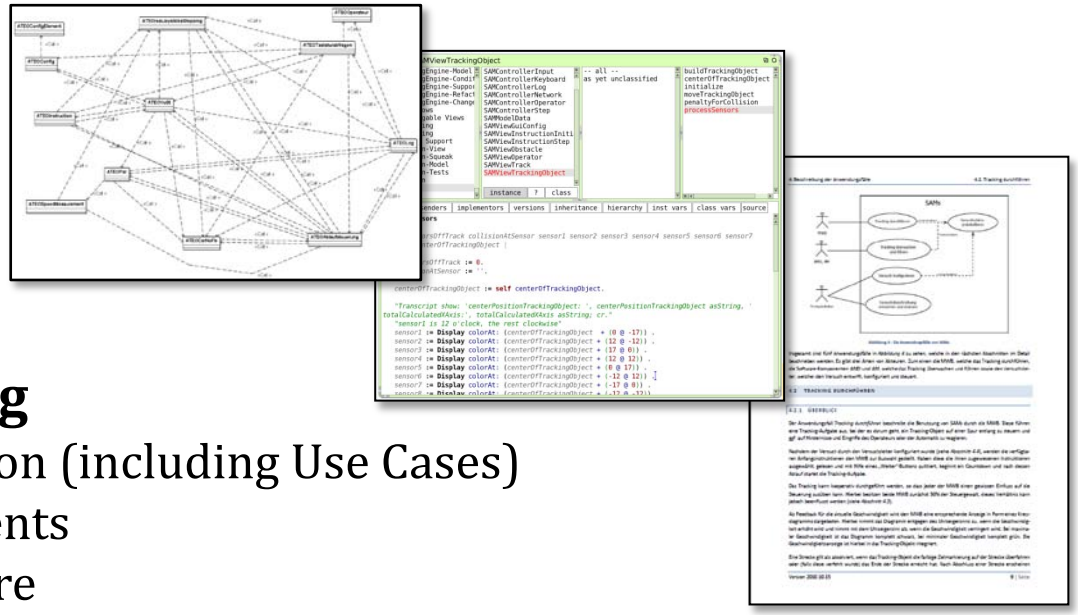
Seminars & Theses

- **4 HMI seminars given**
  - reverse engineering
  - test development
  - development of smaller modules
  - recruitment of students

- **20 theses (some in progress)**
  - development of larger modules
  - reengineering
  - detailed analysis (performance e.g.)



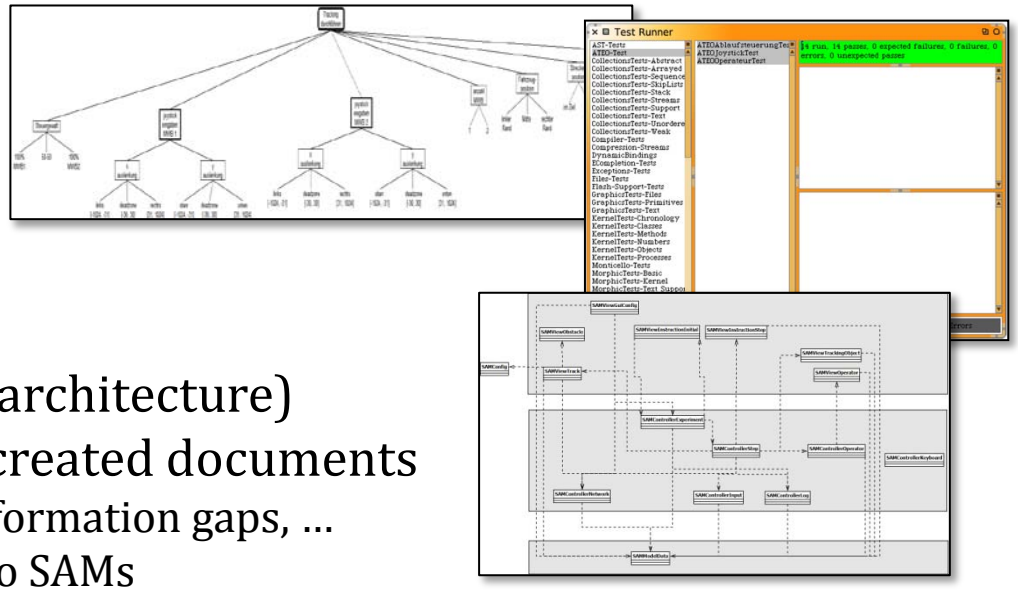
Courses (1)



- **HMI 2007 / 2008**
  - **subject:** SAMs 1.5
  - **reverse engineering**
    - software specification (including Use Cases)
    - Source code comments
    - software architecture

- **HMI 2008 / 2009**
  - **subject:** SAMs 2.0
  - **Reviewing / Updating** created documents
    - purging errors, filling information gaps, …
    - incorporating changes to SAMs
  - **Adding test cases**
    - systematic **test case selection** using **CTM**
    - test case **implementation** using **SUnit**

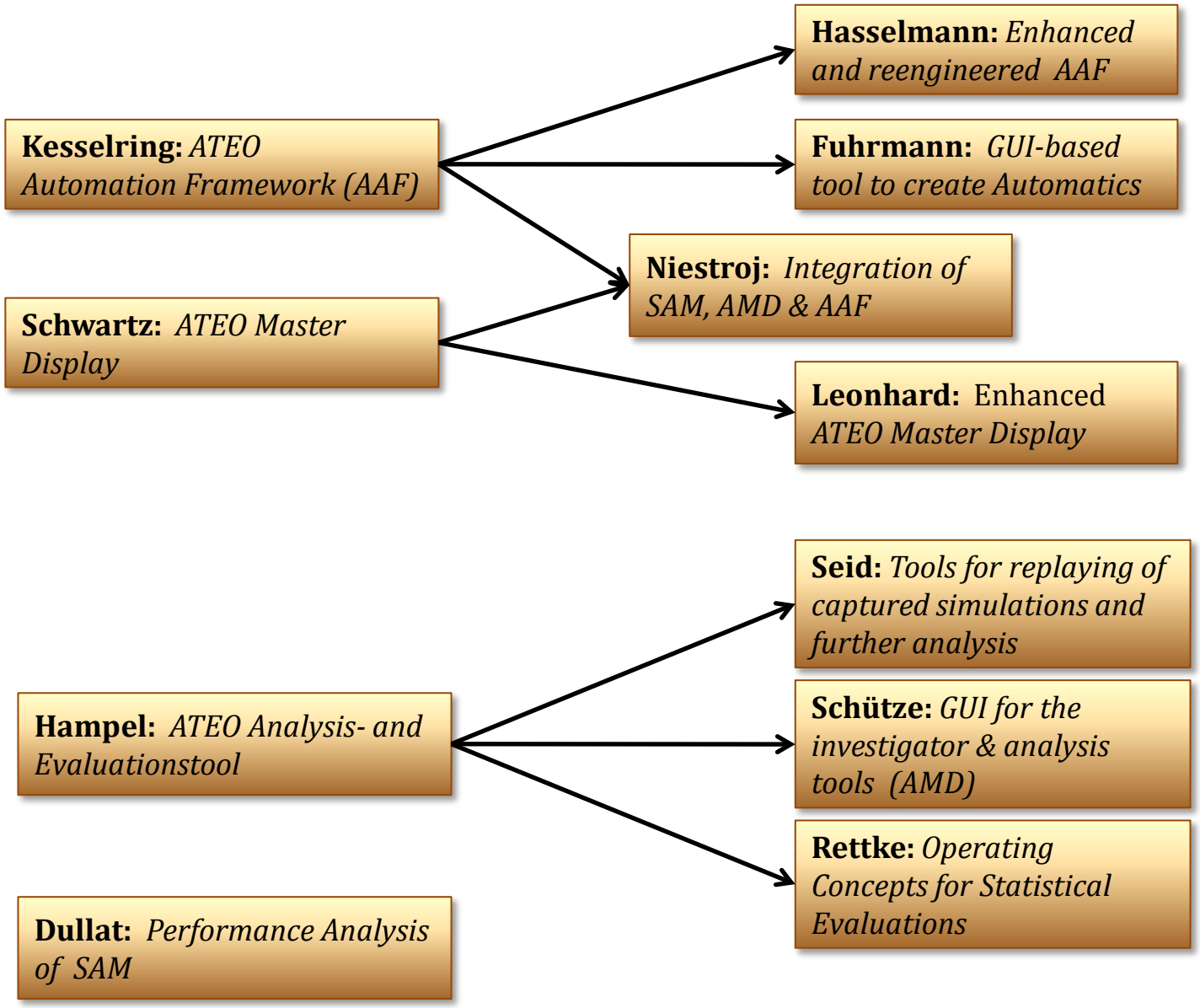
Courses (2)



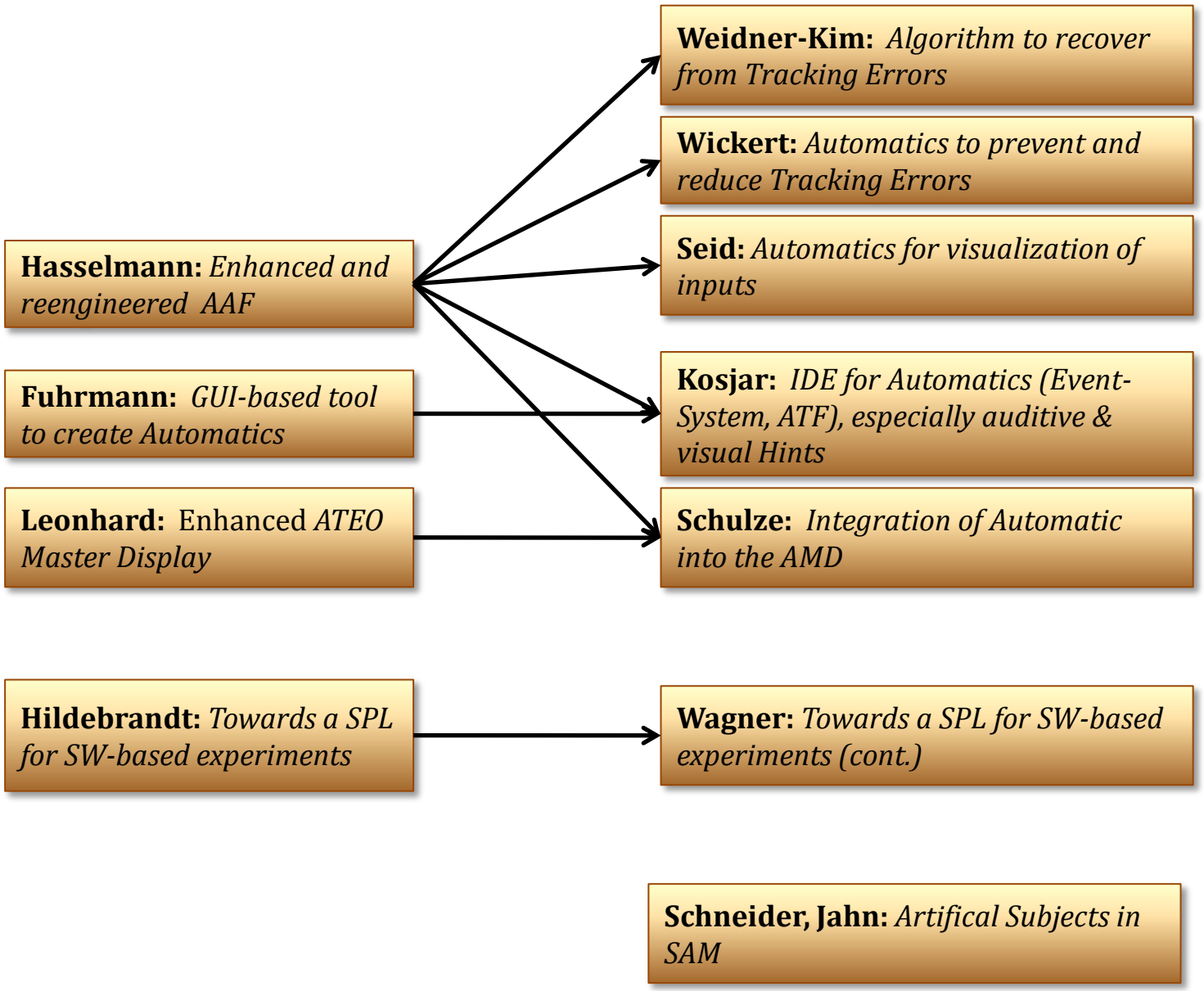
- **HMI 2009 / 2010**
  - **subject:** SAMs 2.2 (new architecture)
  - **Reviewing / Updating** created documents
    - purging errors, filling information gaps, …
    - incorporating changes to SAMs
  - **Adding / Updating test cases**
    - systematic **test case selection** using **CTM**
    - test case **implementation** using **SUnit**

- **HMI 2010 / 2011**
  - SAMs reached final stage
  - focus on automation module of ATEO
  - **development of automatics**
    - **domain analysis** & **conception** of automatics
    - **requirements specification**
    - **Object Oriented Design**
    - implementation using **ATEO Automation Framework** (AAF)

Theses (1) [IT contributions]



Theses (2) [IT contributions]



Summary

- **cooperation with the psychologists since 4 years**
  - 4 conjoint seminars hold
    - involving 73 students in total, ~18 per seminar
  - 20+ theses assigned
- **real projects experience for the students**
  - **real** development environment
    - time pressure, deadlines
    - dealing with several tools (Git, Wiki, SUnit, …)
    - dealing with other developers (& their documentation)
  - **continuously** changing requirements
    - it's a research project after all
  - **interdisciplinary** teamwork
    - dealing with different knowledge backgrounds
- **reporting of results / experiences**
  - present their results / problems to the **project staff**
  - present their results / experiences to **other students** (seminar)

THAT‘S IT!

Questions?

Hints?

Additions?