



Panel 5

Self-Study

A Practical Example and the Results



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Interoperability of Simulations,
RWTH Aachen University

I. Use Case Scenario

II. Theoretical Background

III. Results

IV. Related Projects

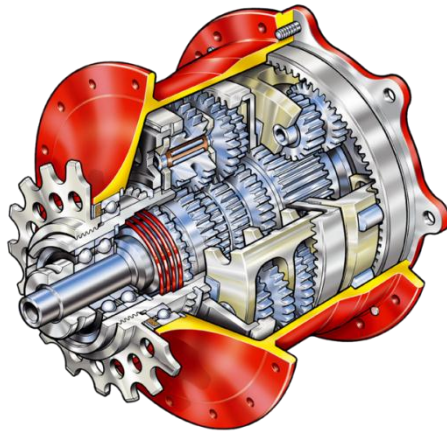
- Content of the lecture: Introduction to Software Engineering
 - Java
 - Basics of object-oriented programming
 - Project management
 - Software development processes
 - Requirements analysis
 - Software design
 - Testing

- Objective of the affiliated laboratory:
 - Practical introduction to Programming
 - Consolidation of contents of lecture by application

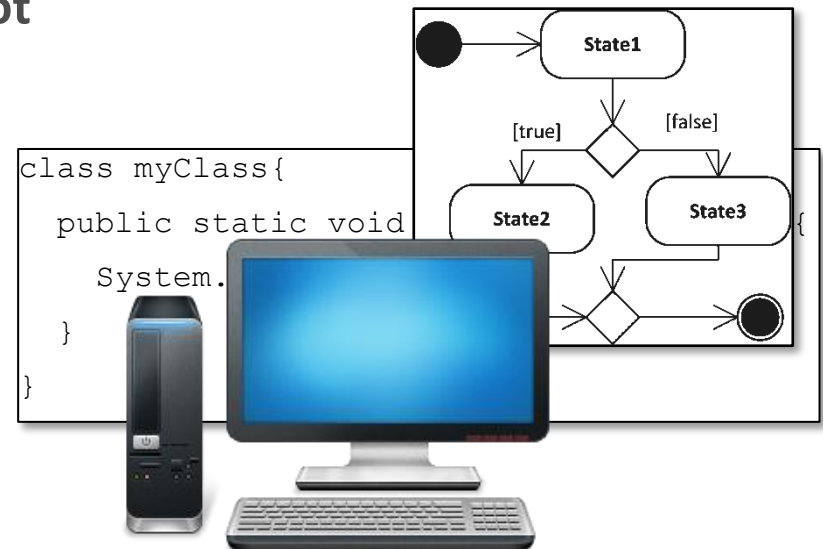
- Huge number of attendants
- Limited resources
- Varying previous knowledge
- Prejudices against programming
- Low motivation



“I am studying Mechanical Engineering, not Computer Science“



VS.



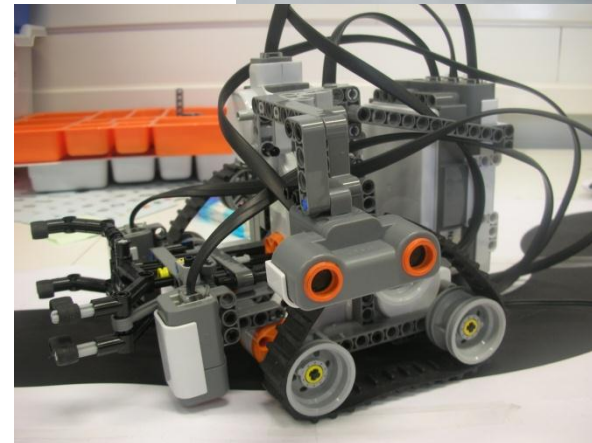
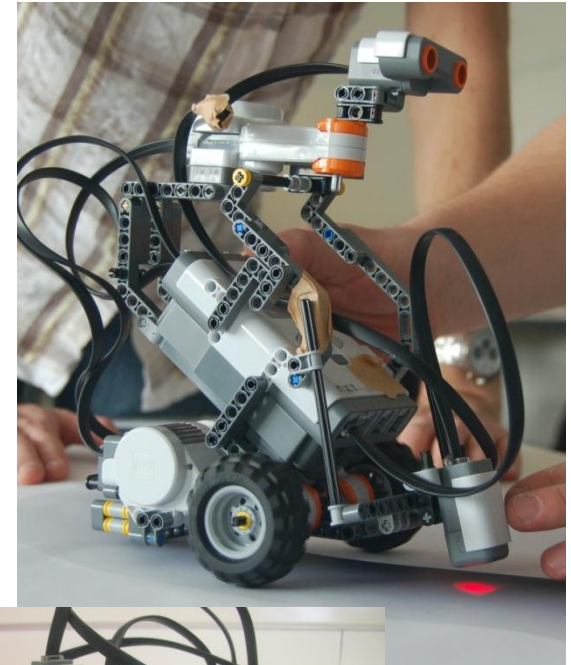
- Avoid unnecessary complexity
- Provide success in early stages
- Self-contained and applicatory tasks
- Establish a connection to topics from Mechanical Engineering

➤ Medium of Choice: Robotics

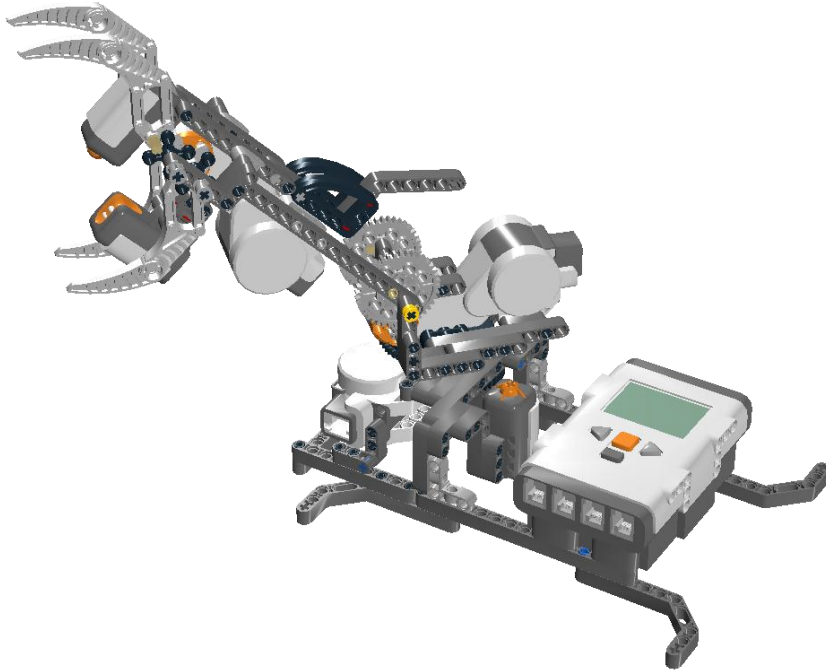
- Platform: LEGO Mindstorms NXT
- Firmware: LeJOS
- Programming in teams of two



- Usual Mindstorms courses:
 - Students build robots themselves
 - Each group needs own robot
 - Demand for more storage space
 - Students build individual robots
 - Robots cannot be shared
 - Individual problems
 - Models are often mobile
 - Demand for test areas
 - Debugging via Bluetooth

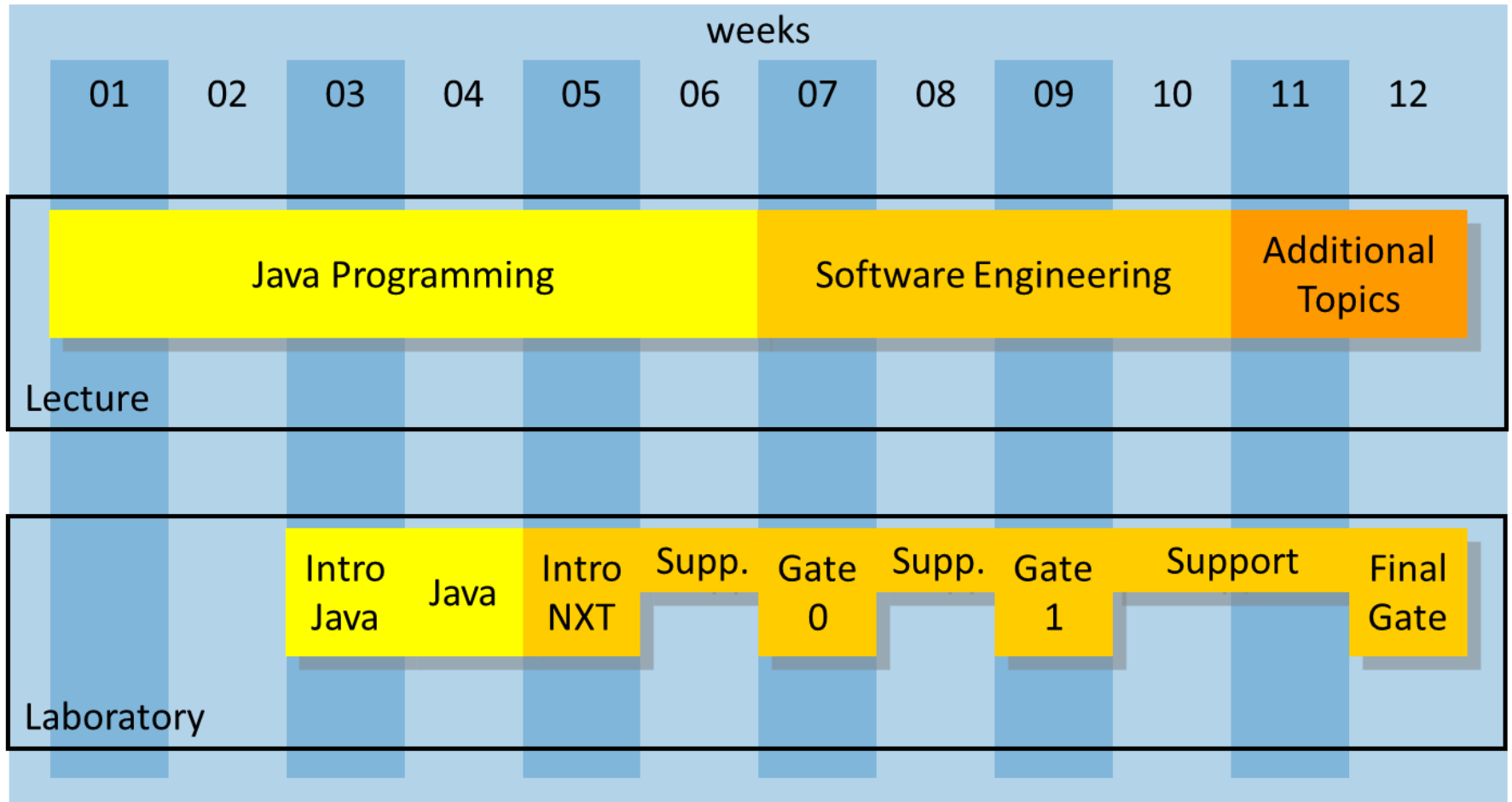


from lfb.rwth-aachen.de



Use of a preconstructed fixed crane model

- + Close relation to applications within Mechanical Engineering
- + One setup
- + No time spent on construction
- + Model can be used subsequently by several groups
- + No additional testing areas
- + Data transfer via USB
- Students cannot construct their own robot
- Predetermined setup constricts students



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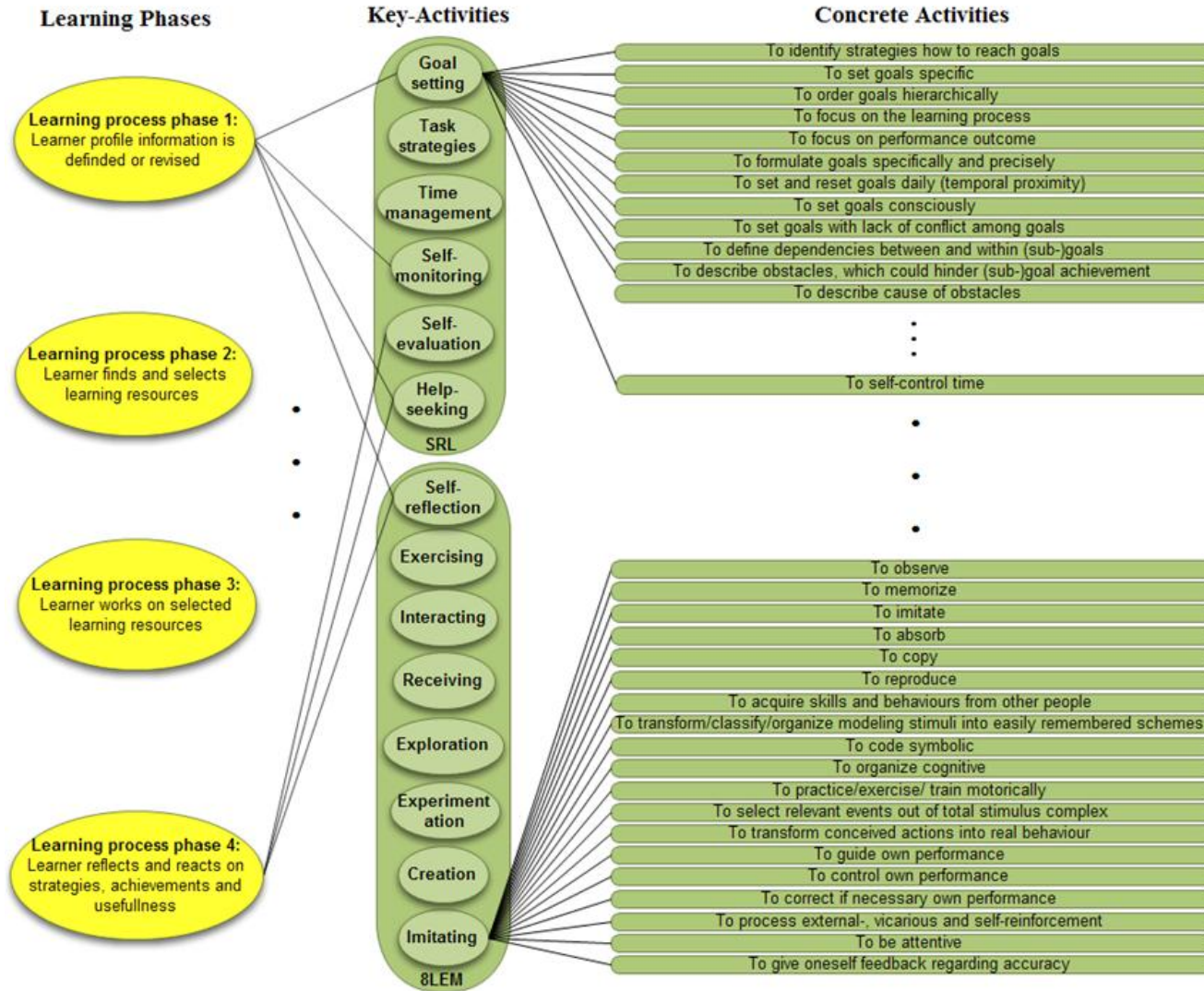
Theory-based recommendations

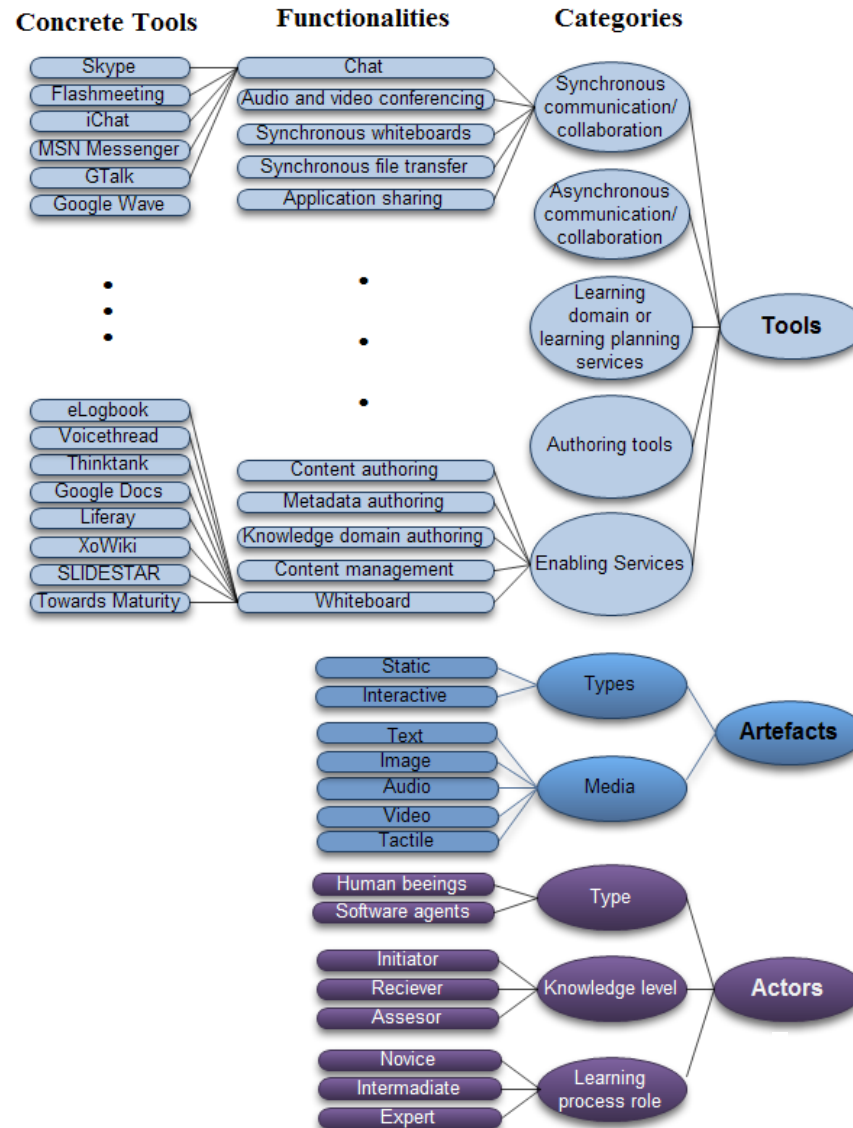
Learning activities

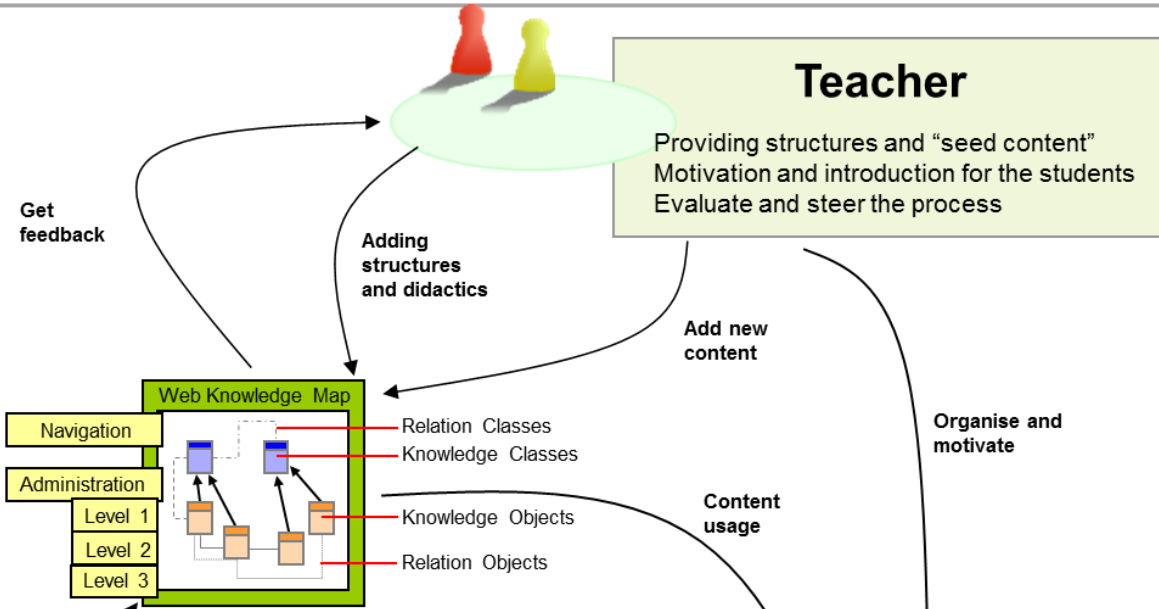
- **Learning process phase**
- **Key activities:** groups of activities with focus on certain aspects
- **Concrete activities:** can be ordered in sequences

Learning resources

- **Learning tools/services** can be recommended based on the chosen learning activities and on the skills of a learner
- **Artefacts:** any product of individuals or groups or of their behaviour or interactions (e.g. documents)
- **Actors:** human beings and (software-) agents







- Personal History:**
- 1. Objekt
 - 2. Alphabetic Index
 - 3. Aggregation
 - 4. Objektorientierter Entwurf
 - 5. Assoziation

History with CAM-widget



ZLW/IMA Knowledge Map zur Info1-Projektaufgabe

 SEARCH

Objekt

Ein Objekt ist gekennzeichnet durch eine Identität, durch einen Zustand und durch ein bestimmtes Verhalten. Ein Objekt wird durch eine Klasse definiert.

Knowledge Map

Ein Beispiel hierfür ist eine Klasse `BauteilA`, aus der das Objekt `BauteilA` instanziiert wird. In der Klasse werden Attribute wie Länge und Breite definiert, die erst im Objekt mit konkreten Werten belegt werden können. Gleiches gilt für die Methoden, die in der Klasse definiert werden, aber nur für das konkrete Objekt ausgeführt werden können.

Im Programm interagieren die Objekte durch den Austausch von Nachrichten, d.h. dem wechselseitigen Aufruf von Methoden.

Die Methoden eines Objektes bestimmen welche Nachrichten es empfangen kann.

Objekt 16,0 MB

Click here to expand the **feedback** form

- besitzt Attribut +
- besitzt Methode +
- hat Beziehung +
- hat Objekt Lebenslinie +
- hat Kontrollfokus +

Chat-widget for collaborative learning

Change Nick John Doe Online

General Objekt x

This room is not anonymous.

John Doe

Session active

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Start Date: 10.08.2012, 15:05 h

End Date: 18.09.2012, 11:27 h

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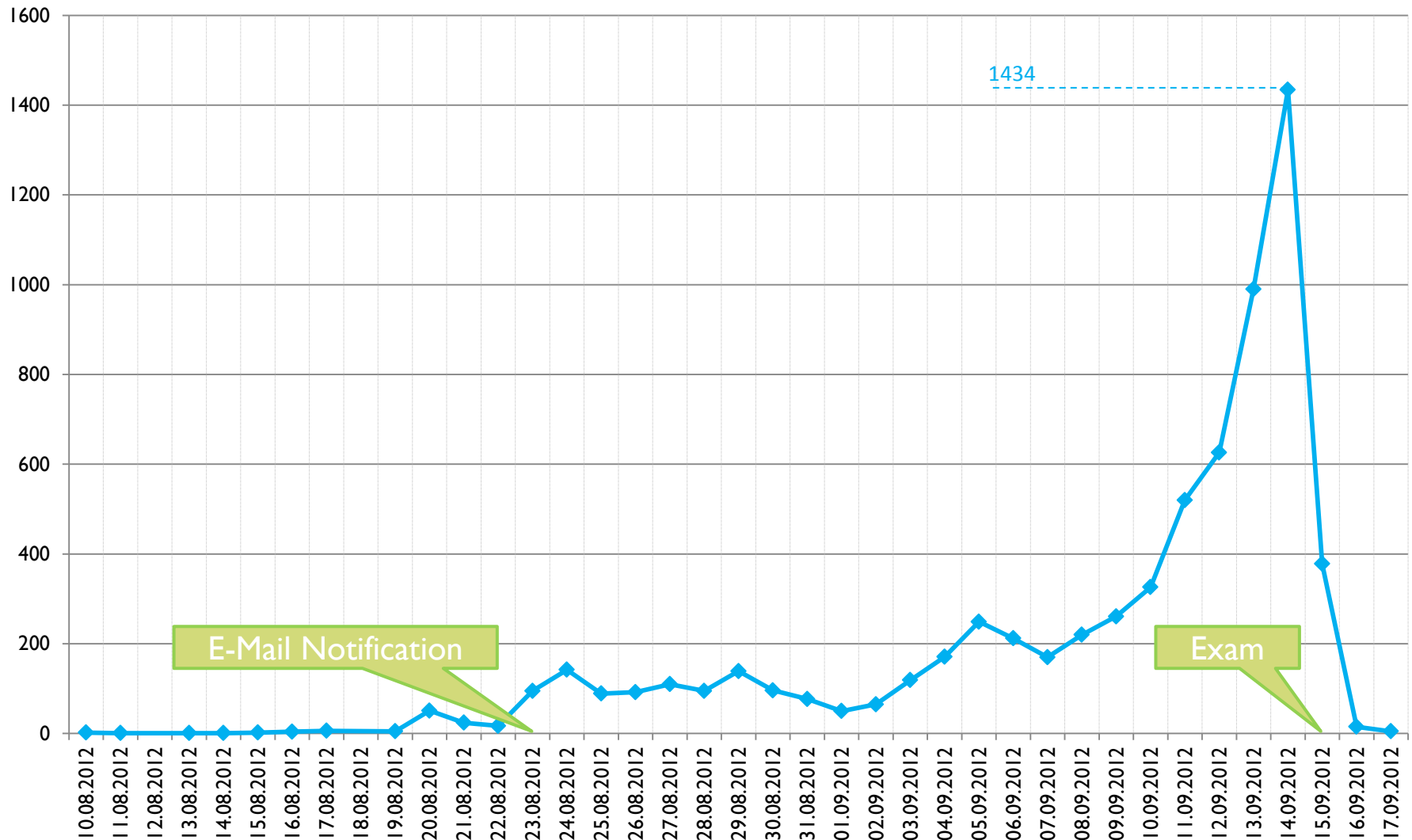
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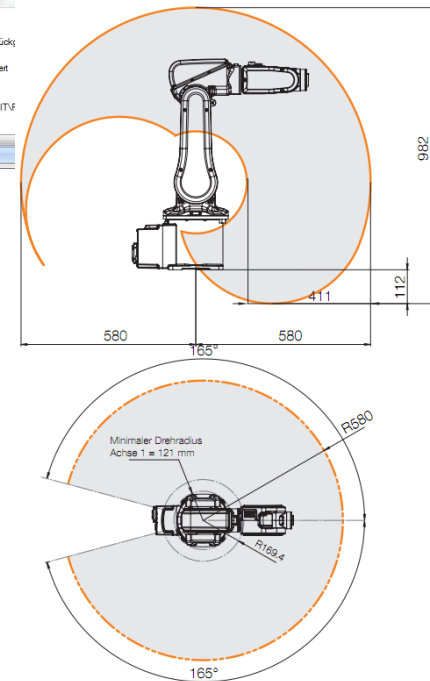
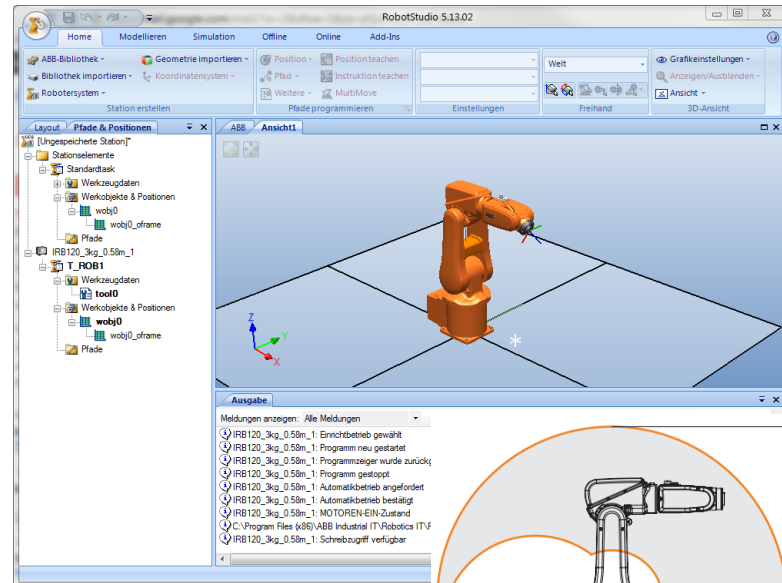
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Accessed articles per login: 25

Logins



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ROLE – Responsive Open Learning Environments

- European collaborative 4-year project (16 research groups from 6 EU countries and China, 2009-2013)
- Centred around the concept of self-regulated learning to create responsible and thinking learners
- Tools from ROLE Widget Store helps teachers to create open personal learning environments for their students with support for
 - planning their learning process
 - searching independently for resources
 - learn and reflect on their learning process and progress
- IMA/ZLW&IfU: Knowledge Map testbed including the Web 2.0 Knowledge Map (Wiki with additional visualization capabilities, WKM), chat & history widget
 - Used in course for information science in mechanical engineering with +1500 students incl. tool evaluation



To read more:

- ROLE'n Web: <http://www.role-project.eu/>
- WKM testbed: <http://role-showcase.eu/widget-bundle/knowledge-map-and-chat-tool>



ExAcT is part of state-countries program “RWTH 2020 Excellence in Teaching and Learning” and part of the project “RWTH 2020 – Improving teaching quality together“ of the Institute Cluster IMA/ZLW & IfU at the RWTH Aachen university.

- ExAcT Qualification
 - Advanced training and competence impartation for academics at all levels of a university career
- ExAcT Research
 - practice-orientated and student-centered teaching research on media- and subject-didactic issues in the context of different disciplines
 - Networking of all actors involved in teaching at the RWTH University



Empiricism & surrounding parameters



Best Practice Monitoring

Collaboration of the CoP and the Advisory Board

Curricular development



Assessment

Orientation Phase

...

TopING

Concepts for Teaching and Learning



Shift from Teaching to Learning:

Problem-based Learning

Testing based on skills



Skill oriented

Integrated in the learning-process

Checking of Learning Outcomes

Teaching experiments



Didactic skill enhancement of secondary- and impact-research

Large classes



Appropriate teaching and learning concepts



Questions?

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