INTEGRATION OF **EDUCATION FOR SUSTAINABLE DEVELOPMENT** INTO THE UNIVERSITY CURRICULUM VIA LECTURES AND PROJECTS

COOPERATION BETWEEN UNIVERSITY, **CITY ADMINISTRATION, AND SOCIETY** IN AALEN

EUROPEAN RCE MEETING – VANNES

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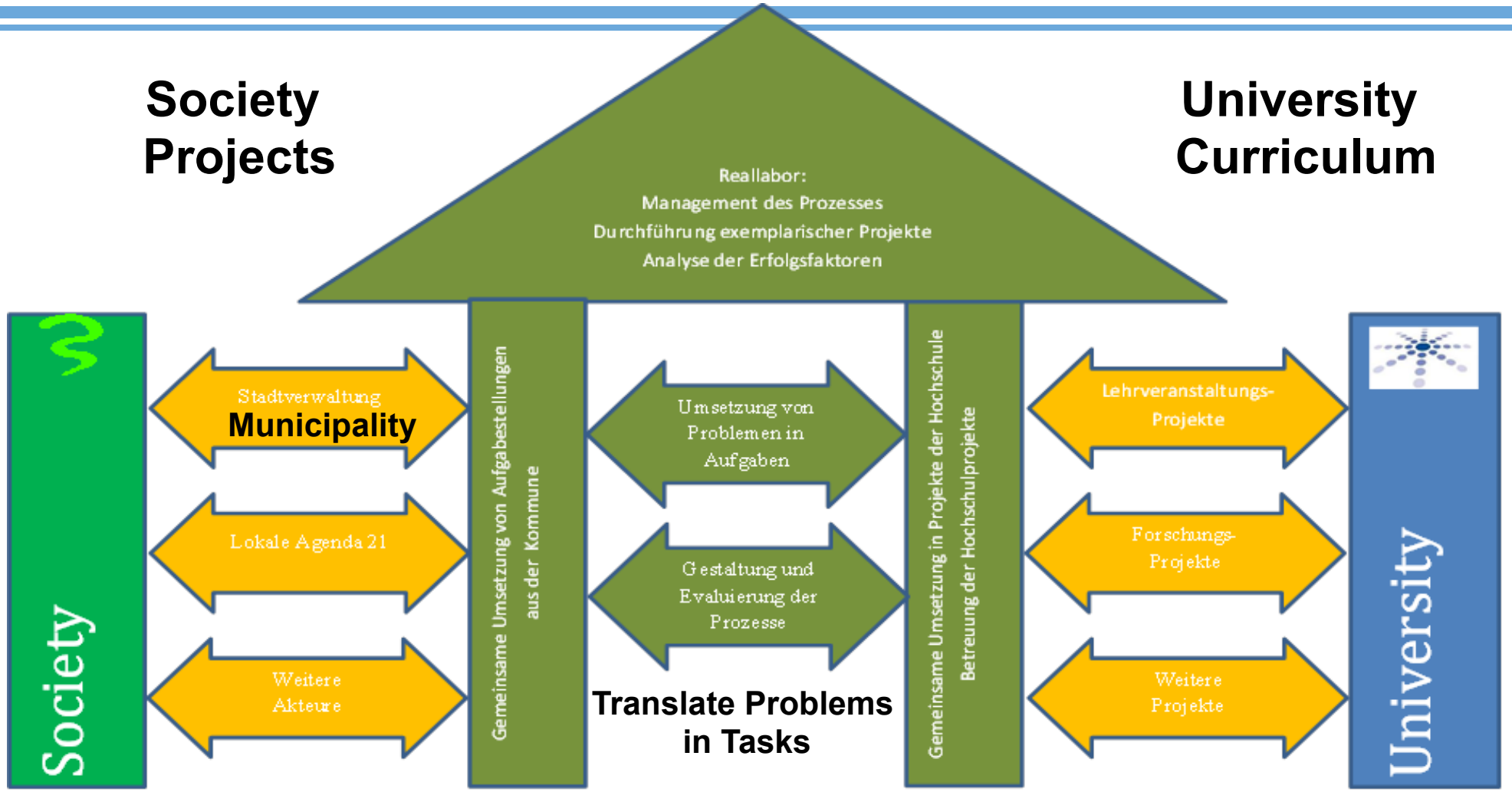
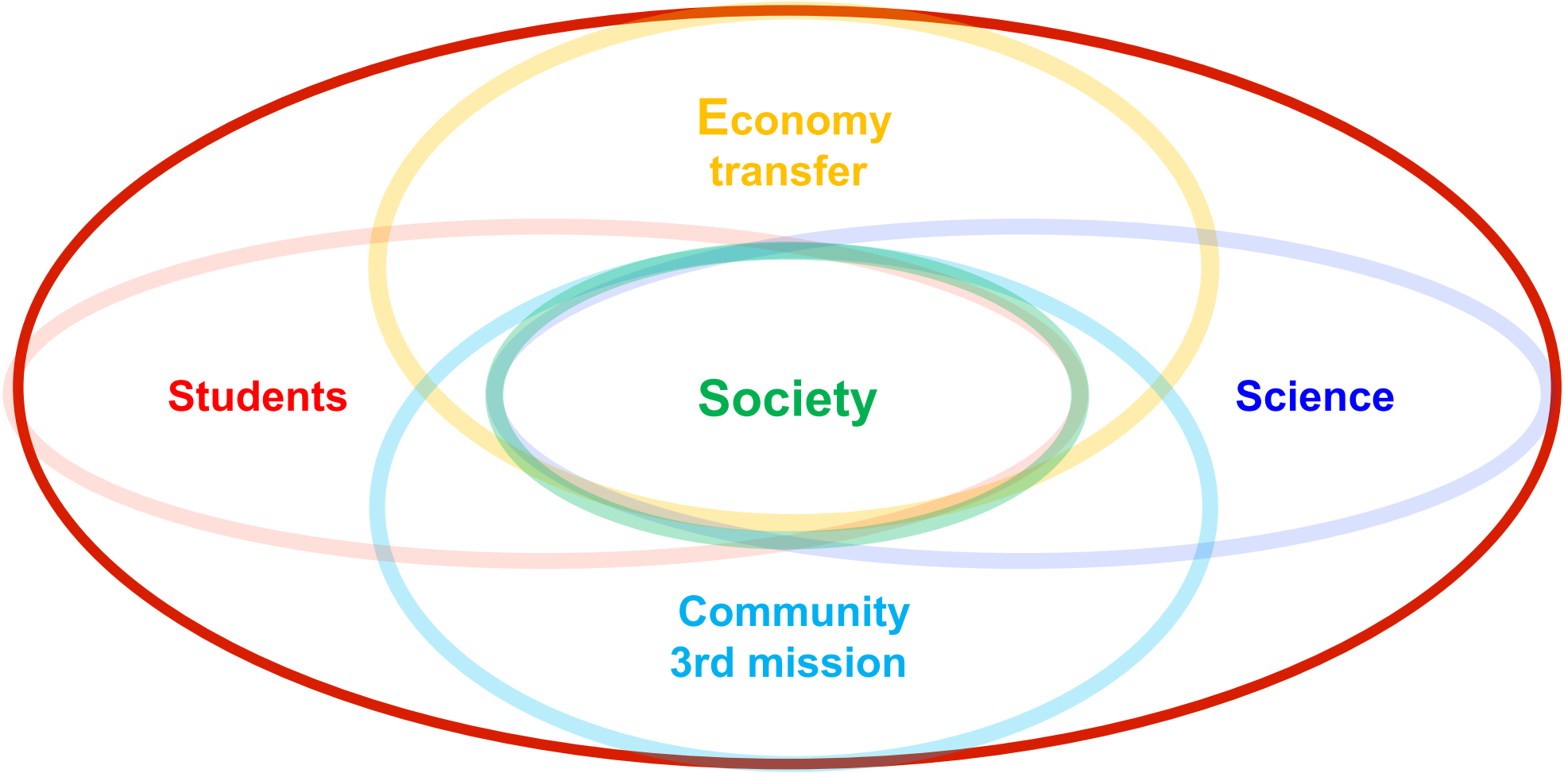
Aalen University (GERMANY)

Real World Lab Aalen



Responsible University
responsive to the needs of all stakeholders

Aalen University



PROJECTS
and
PROJECT METHOD

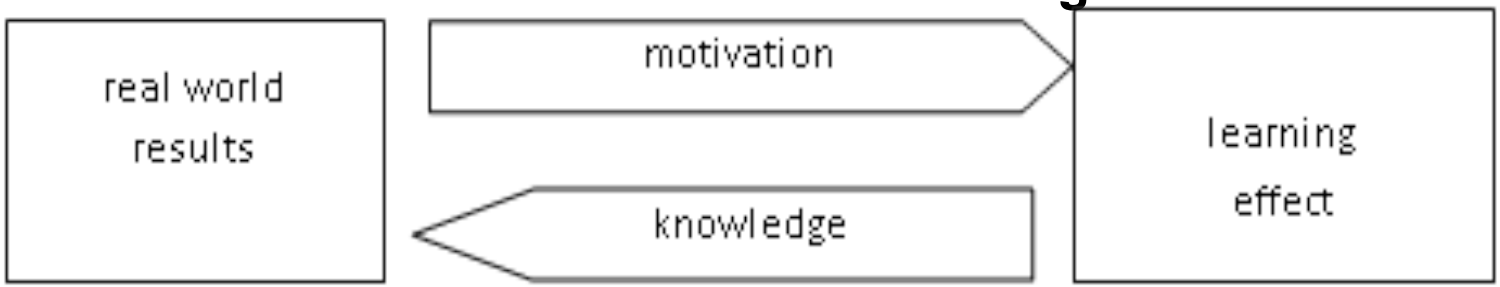
Learning through projects

Differences between goal-oriented and educational-oriented projects

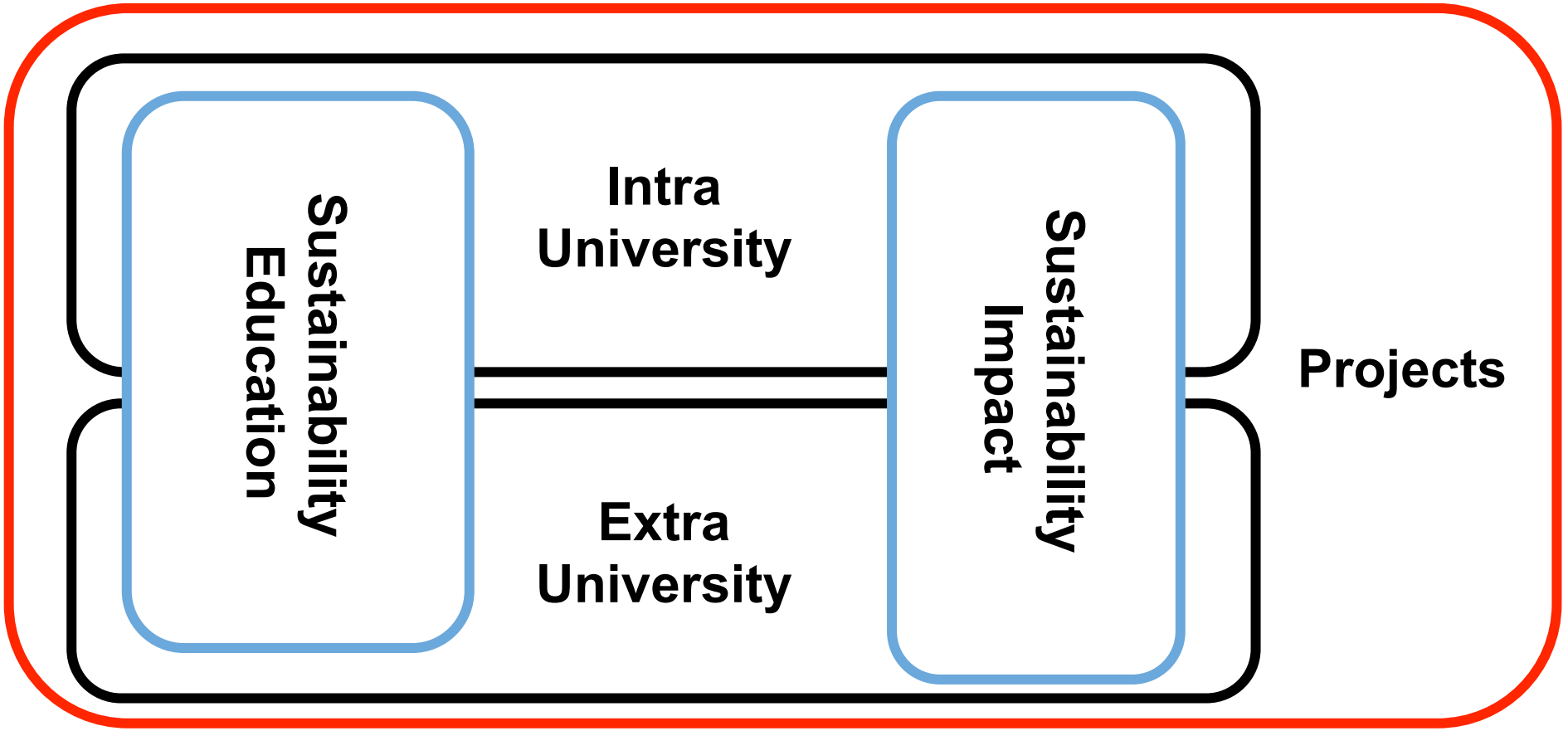
- Goal-oriented projects:
  aim: a dedicated target (a scientific result, a documentation, …)
- **Education-oriented projects:**
  aim: "the journey is the reward" = learning outcome during project work

Condition of the projects:

Project result has impact on real world
=> motivation for students and better learning effect



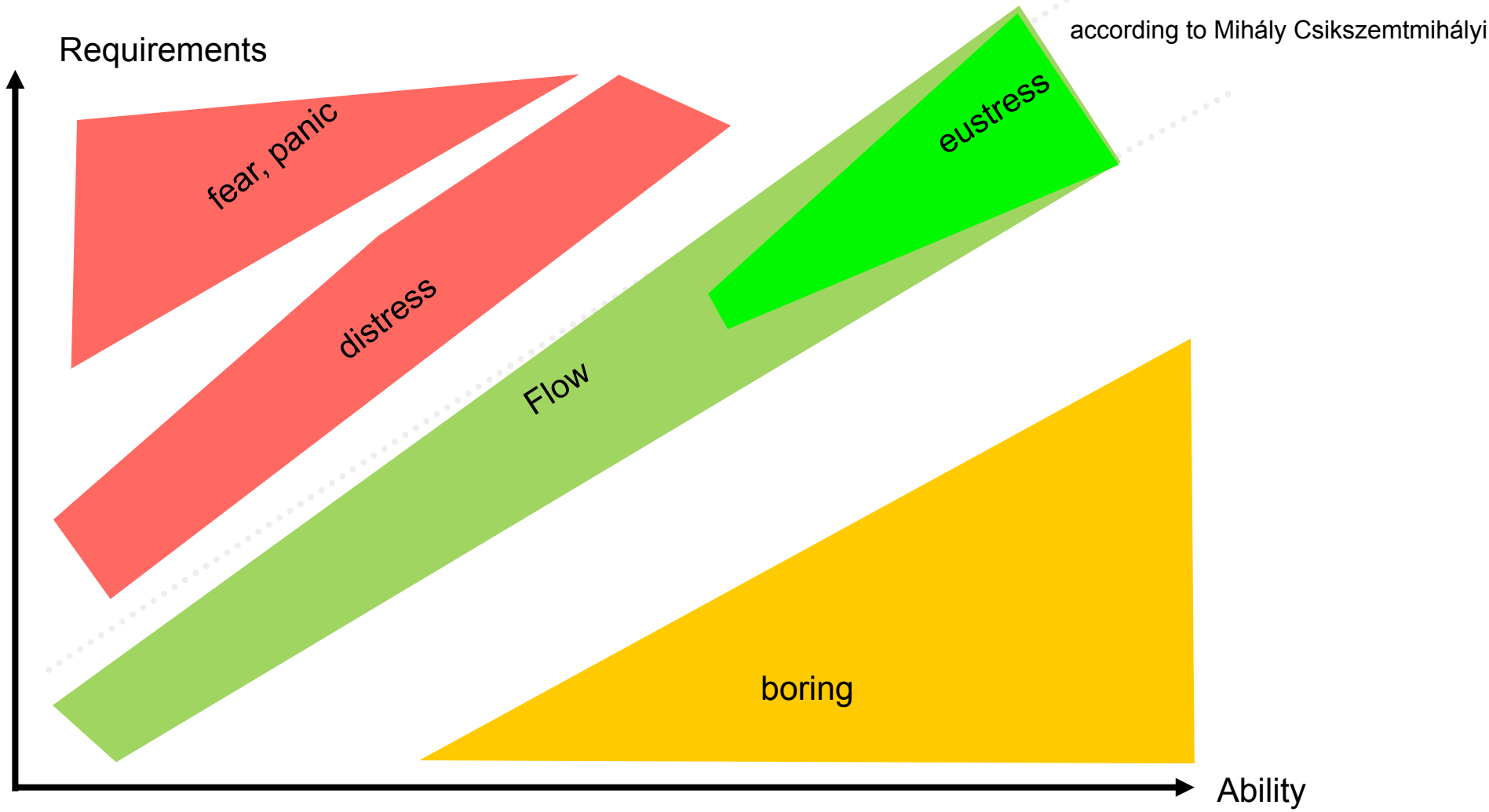
Projects in tertiary Education for Sustainable Development



Competences

- **Facts (statements)**
- **Knowledge (systems)**
- **Problem solving competence Management, Business**
- **Social Competence Intercultural Competence**
- **Personal Competence Attitudes, Entreprenurial acumen**
- **Ethical Competence Responsibility**

Projects and Flow

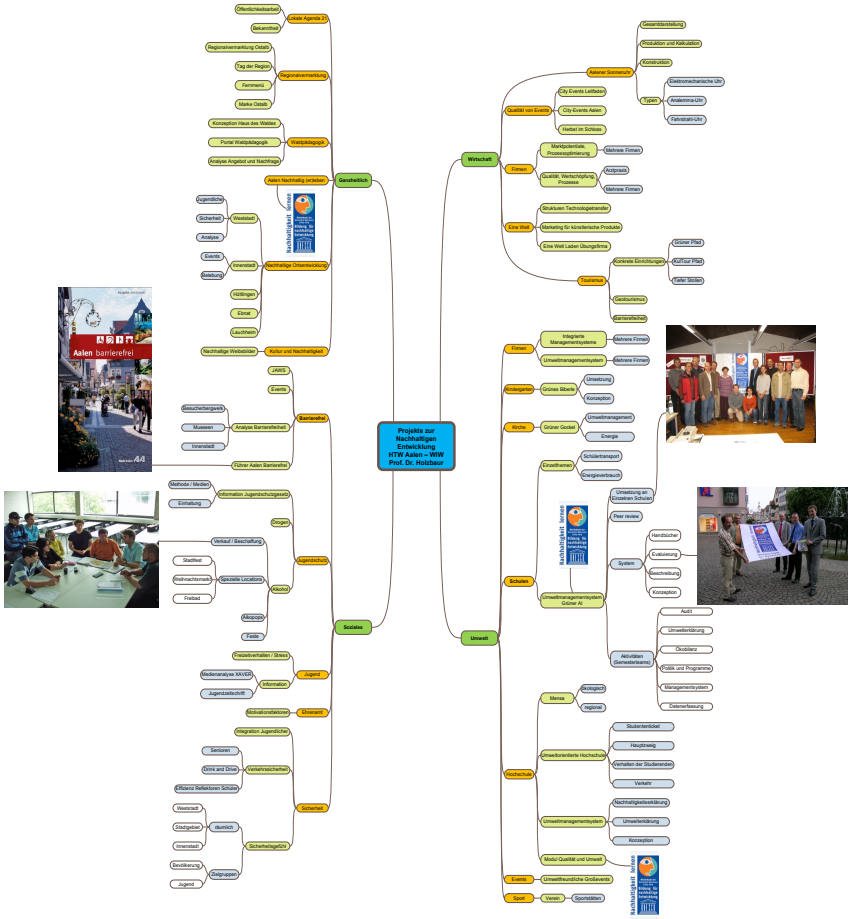


according to Mihály Csikszemtmihályi

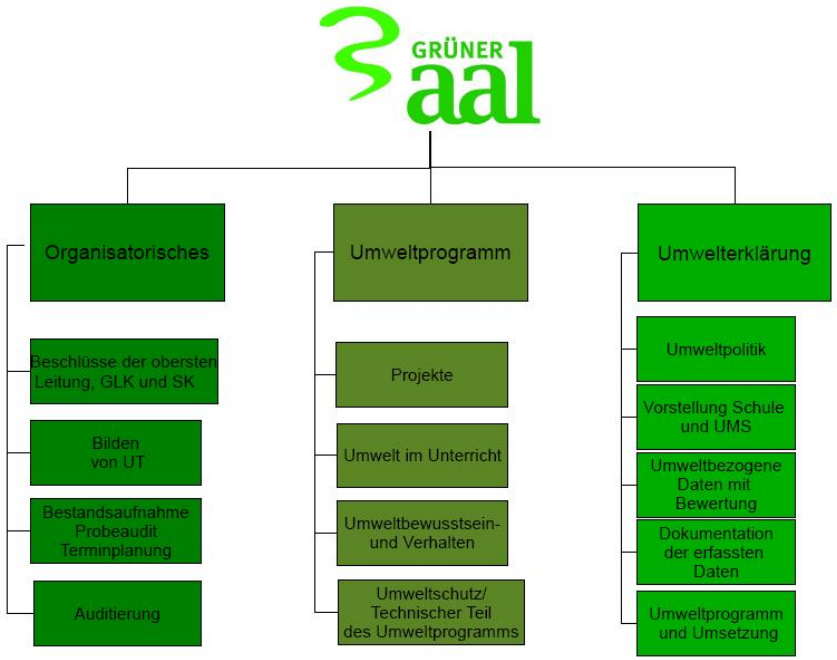
PROJECT EXAMPLES

Project Examples - AAUAS – WIW

- contceptual projects
- investigation projects
- technical projects
- modelling projects
- “hands on” – projects
- etc.

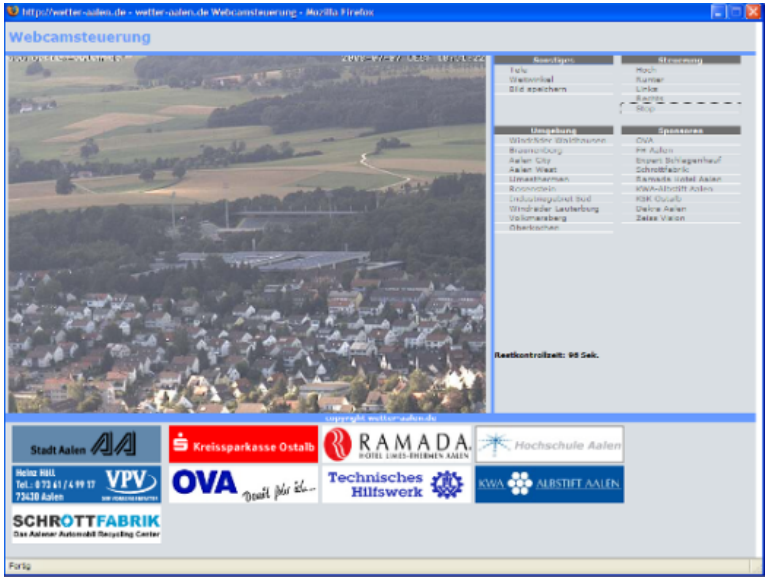


Project Example
Green Eel: EMS for schools



Project Example:
Webcam at the “Aalbäumle”

- Information on
  - sustainable development
  - renewable energies
  - weather forecast system
  - Aalen university and city

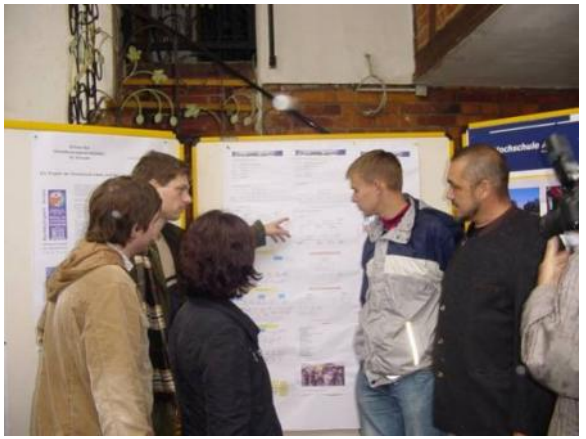


Lego Tower
game on project management

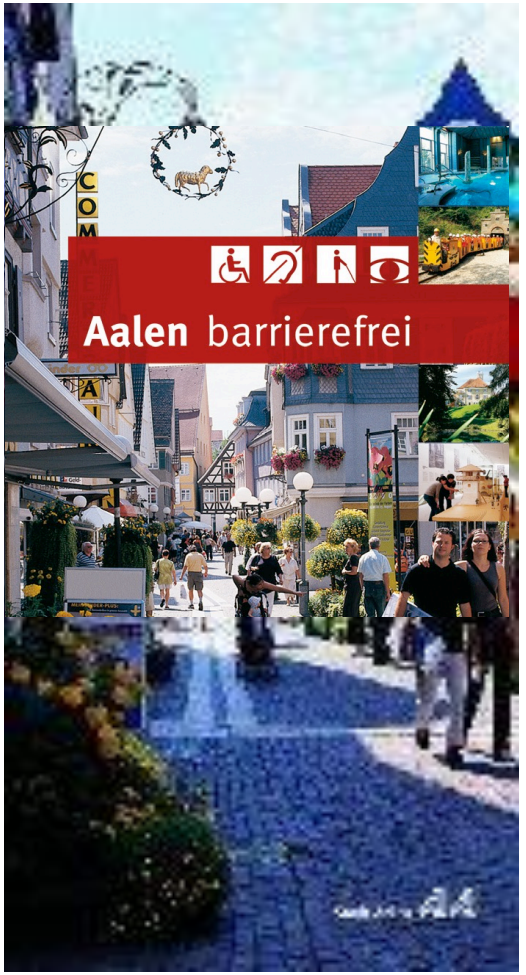
- The planning game:
  - LEGO tower
  - Project management
    - Planning
    - Estimation
    - Implementation
    - Controlling
  - Magic triad
    - Height
    - Resources and Staff
    - Time
- The project
  - Adapt the Game
  - Plan the Event
  - Organise
  - Evaluate the Event

Project Examples - Day of the region and regional marketing

- **Aalen 2006, 2007 …**



Project Example
Aalen for all – Barrier free

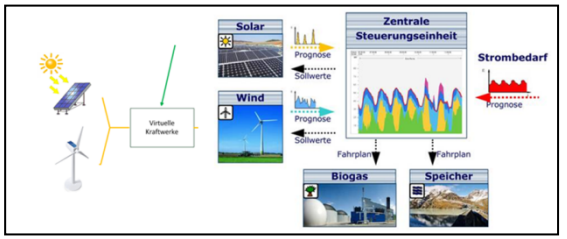


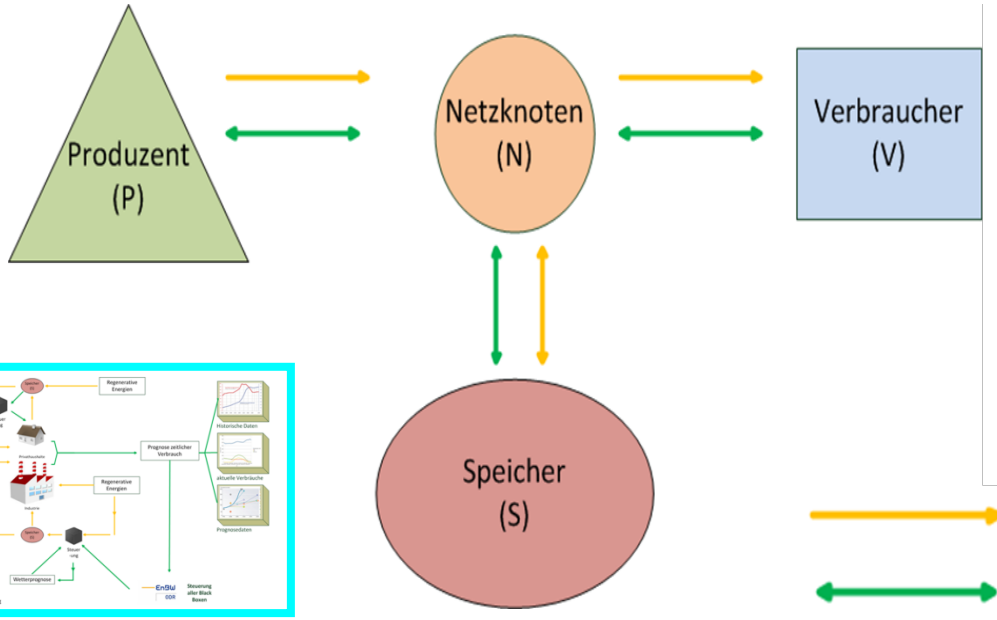
AUSgebechert! – reusable instead of one-way

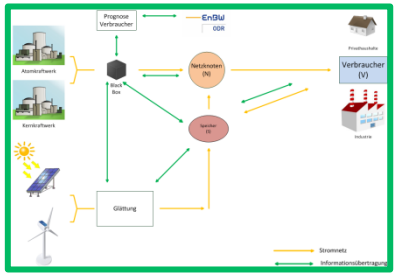
Technical Projects
Smoothie Bike und Repair Night

Example: Modelling for Renewable Energy

- **The optimal use of renewable energy needs models on several scales of**
  - **Space**
  - **Time**
  - **Number**
  - **Reliability**
  - **Decisions**
  - **Carriers**







Science Education by Teaching Science

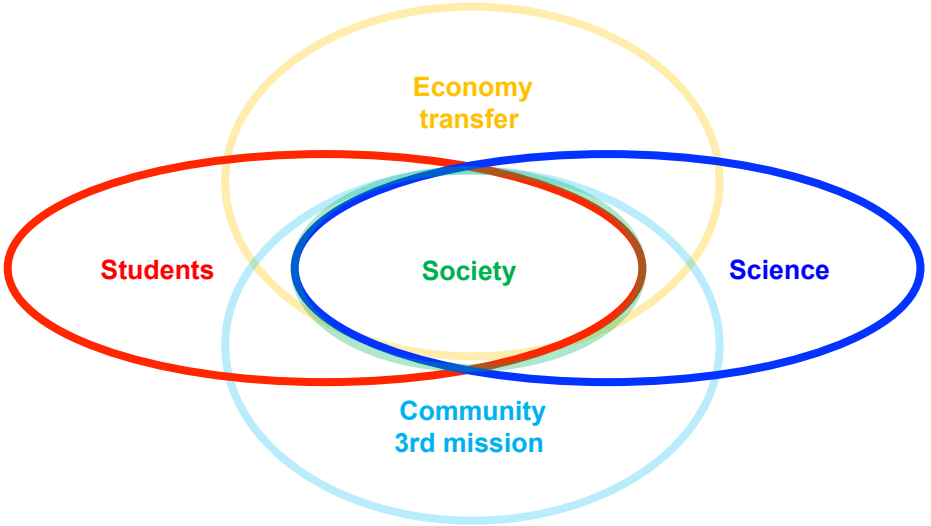
- **Explorhino has a focus on young learners**
- **Students learn by contributing to teaching units and classes. examples:**
  - **Water analysis**
  - **CO2**
  - **Acids**
  - **Paper recycling**
  - **Cooking skills**
  - **Biogas plant**
  - **Brewing beer**
  - **Soap production**
  - **Cleaning**
  - **Energy**
  - **Fire and safety**

EMBEDDING ESD PROJECTS INTO THE CURRICULUM

Curriculum Principles

Aalen University

- From input to outcome
  aims: Employability, Citizenship, ….
- From teaching to learning
- From subjects to competences
- Modularisation: Modules and module fit



From Requirement To Strategy

Aalen University

Requirements of the Students
= Qualification

Requirements of the World of Work
= Training for Lifelong Learning

Requirements of Society
= Education for Citizenship

Requirements of Academia
= Education for Science

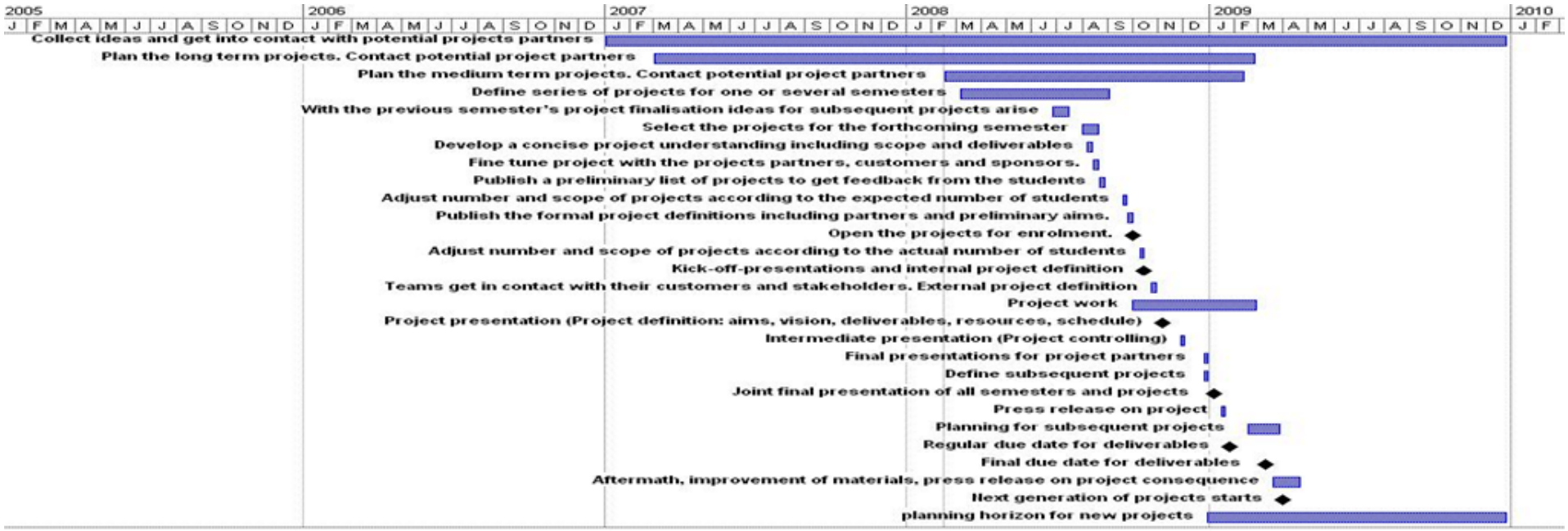
Curriculum

Strategy

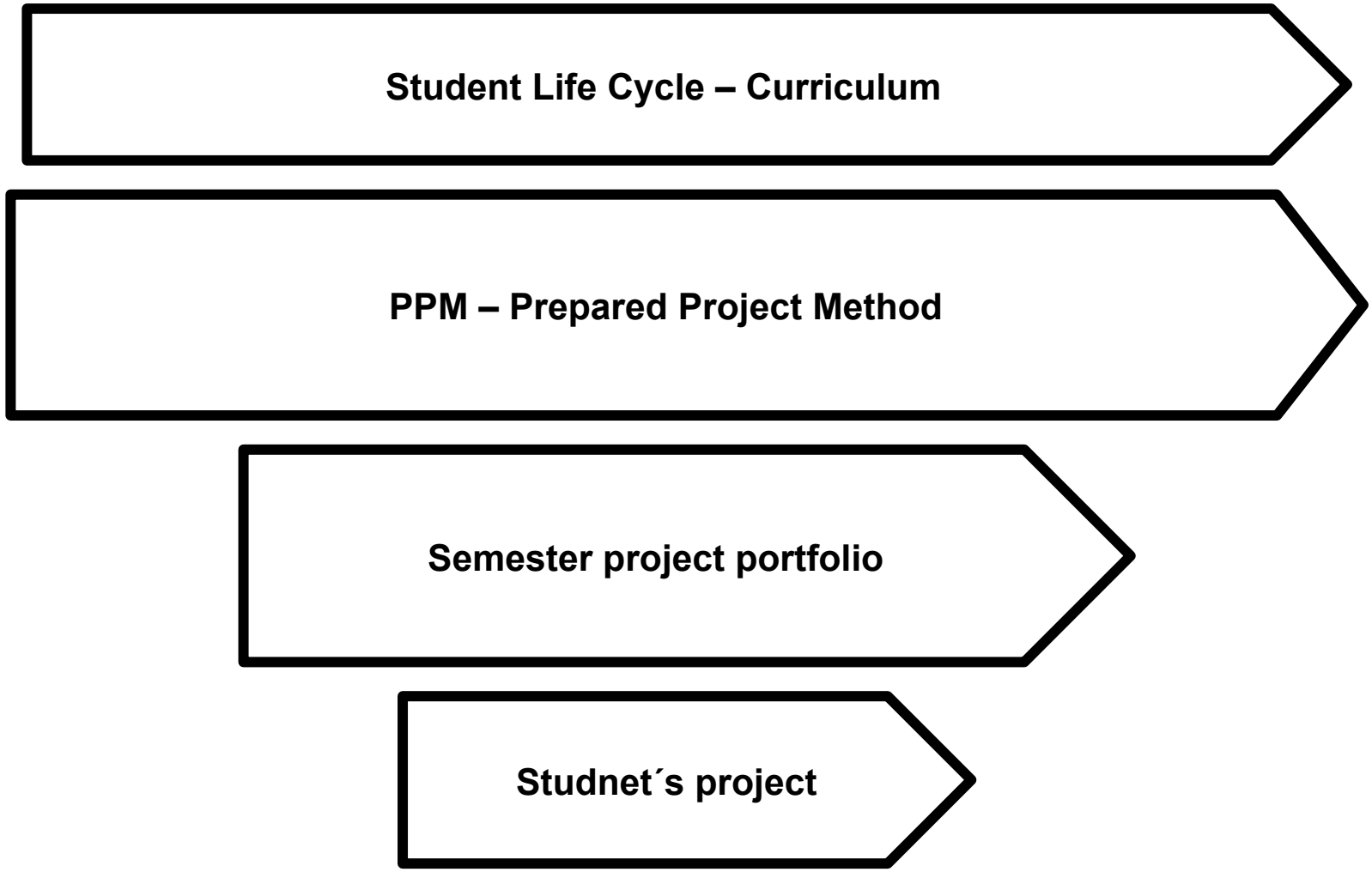
Educational project with real value: PPM schedule

Aalen University

- Stakeholder acqusition: T – 1 year
- Project definition and final definition T – 2 month
- Portfolio adaption and presentation to the students T
- Aftermath (publication, subsequent projects) T + 1/2 year



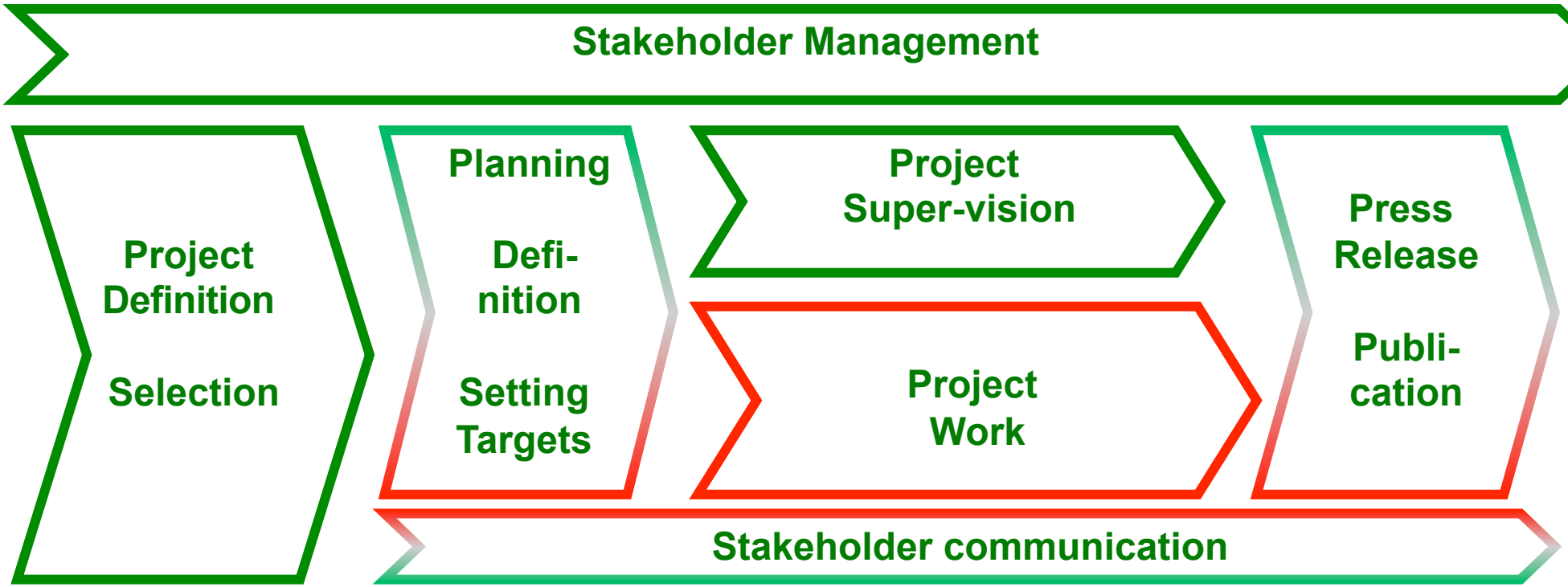
Meta Projects



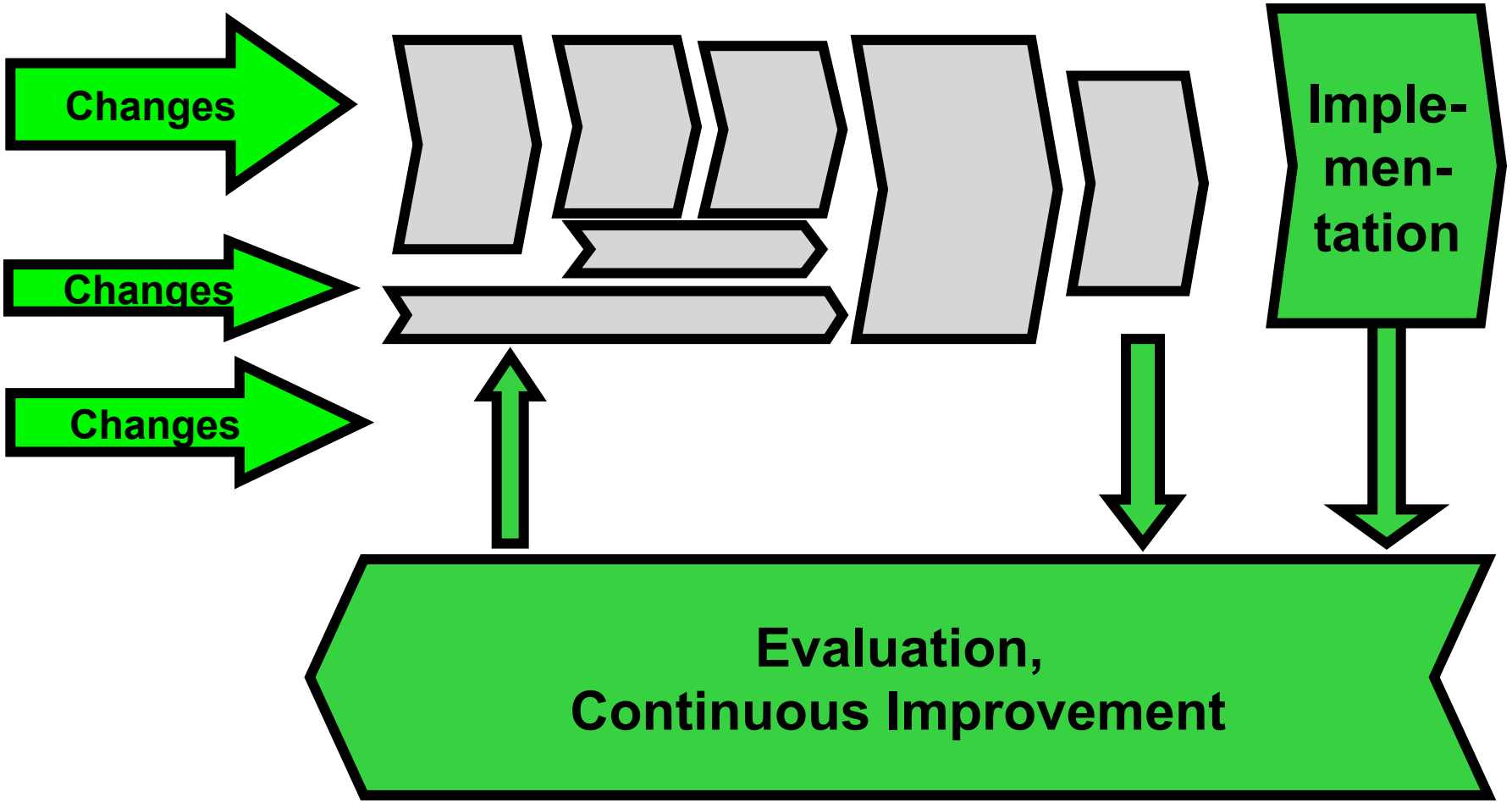
General Success Factors of Students´ projects

Aalen University

- **Success criteria for projects:**
  - **Mutual benefit**
  - **Trust among all partners**
  - **Detailed planning**



Development Process: CIP



Short excursus

rtwe Referat für Technik- und Wissenschaftsethik
an den Hochschulen für Angewandte Wissenschaften des Landes Baden-Württemberg

Department of the Colleges of the State Baden-Württemberg for the Ethics of Technology and Business Ethics (established 1991)

Since 2005: Exchange and network within the UAS in Baden-Württemberg on current topics related to sustainability in UAS and tertiary educational policy

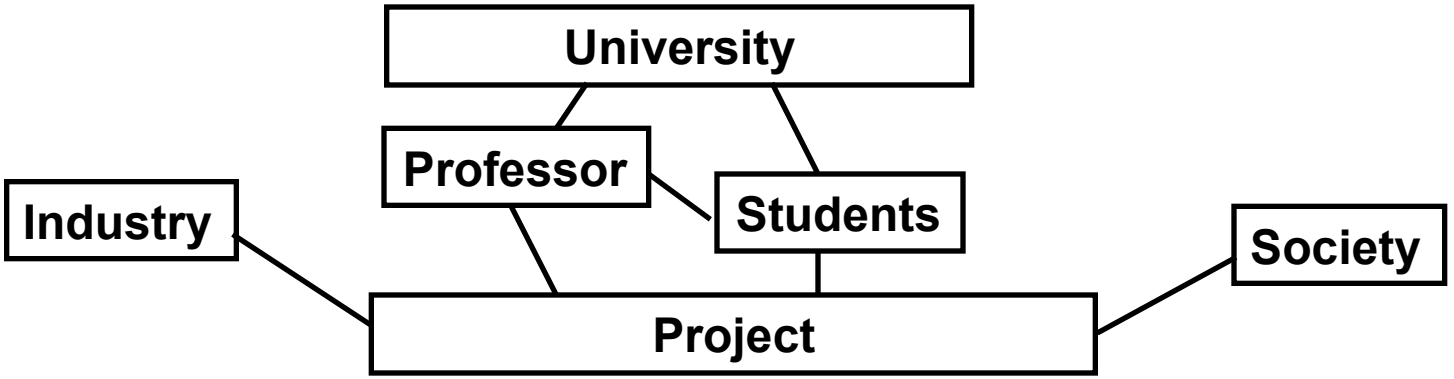
a online-learning platform for students of all disciplines with topics on technology and business ethics

Publications

- Holzbaur, U. (2008): Teaching Quality and Sustainability with Prepared Project Method. INTED2008
- Holzbaur, U.; Lategan, L., Kokt, D., Dyason, K. (2012): Seven imperatives for success in research. sun media, Bloemfontein
- Bühr, M., Holzbaur, U., Venus, C. (2013): Project Learning, Shaping Competence and other competences in Education for Sustainable Development. Edulearn
- Holzbaur, U., Bühr, M., Jordaan, J. (2013): Innovative Methods for Tertiary Education for Sustainable Development. ICEBE
- Holzbaur, U., Wenzel, T., Bühr, M. (2013): Curricular Aspects of Students´ Projects in the Bologna Framework – linking prepared project Method with curricular requirements . Edulearn
- Holzbaur, U., Bühr, M, Dorrer, D., Kropp, A., Walter-Barthle, E., Wetzel, T. (2017): Die Projekt-Methode – Leitfaden zum erfolgreichen Einsatz von Projekten in der innovativen Hochschullehre. Springer, Wiesbaden

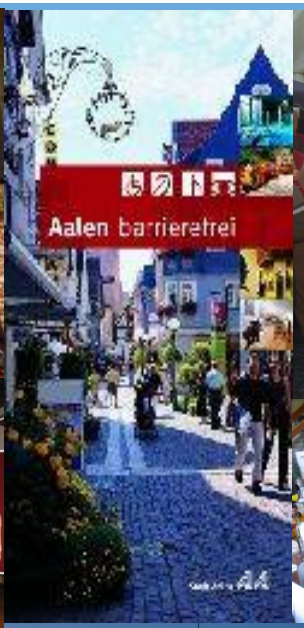
University Projects

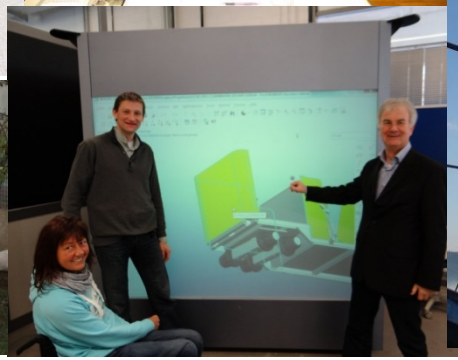
- **Joint Projects**



- **Mutual benefit for University (professor, organization, students) and project partners**
- **Students: do the projects - real world hands on experience**
- **University: reputation and partnership**
- **Professor: practical experience, training success, reaching targets**
- **Partners: projects bring innovative results and new ideas**

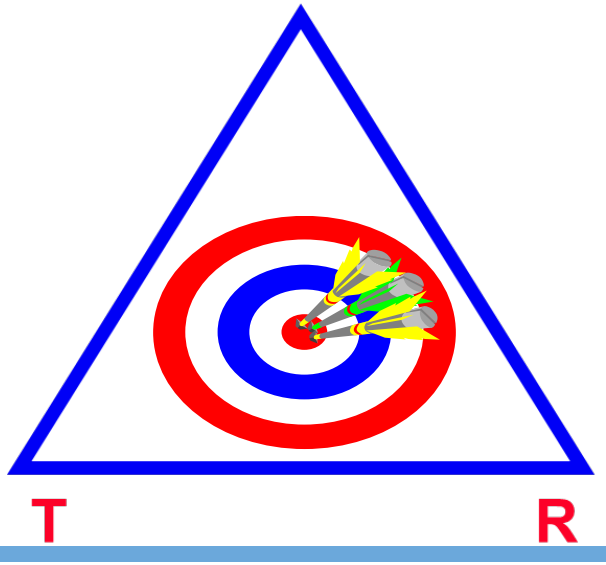
Students´ projects with community stakeholders





Credit bearing Projects in the curriculum

- Projects are an innovative tool of teaching and learning
- Project = a new aim + a well defined deadline + limited resources + a non routine organizational structure
- Presentations have subjects – projects have aims!



Project size and workload

- In the German system, the year has 2 * 30 CP = 60 CP
- 1 CP corresponds to an average workload of 25 to 30 hours including preparation etc.
- For a project at the partner university, we should estimate an amount of work of 20 hours per CP.
- Module size in Aalen is a multiple of 5 CP, hence e.g.
- 5 CP = 100 person hours
  = 2 weeks of intensive work
- 10 CP = 200 person hours
  = 1 month of intensive work
- 15 CP = 300 person hours
  = 50% of the workload of one semester

Integration into the Module

B-Eng Industrial Management / Prof. U.Holzbaur

- **Lectures on a regular basis**
- **Presentations on a regular basis**
- **All projects have real stakeholders and use (reality lab)**
- **Special focus:**
  - **Project Management (German):**
    Project work and stakeholder management
  - **Quality and Sustainabilty (German) :**
    1. QM and SD as object
    2. Implement QM in the project
  - **Sustainable Event Management (English)**
    Research or event organisation
- **Final presentation at the University and for the stakeholders**