



*Matthias Bandtel*

## **The Bicycle as Teaching Object for the Training of technical and soft Skills in University Education.**

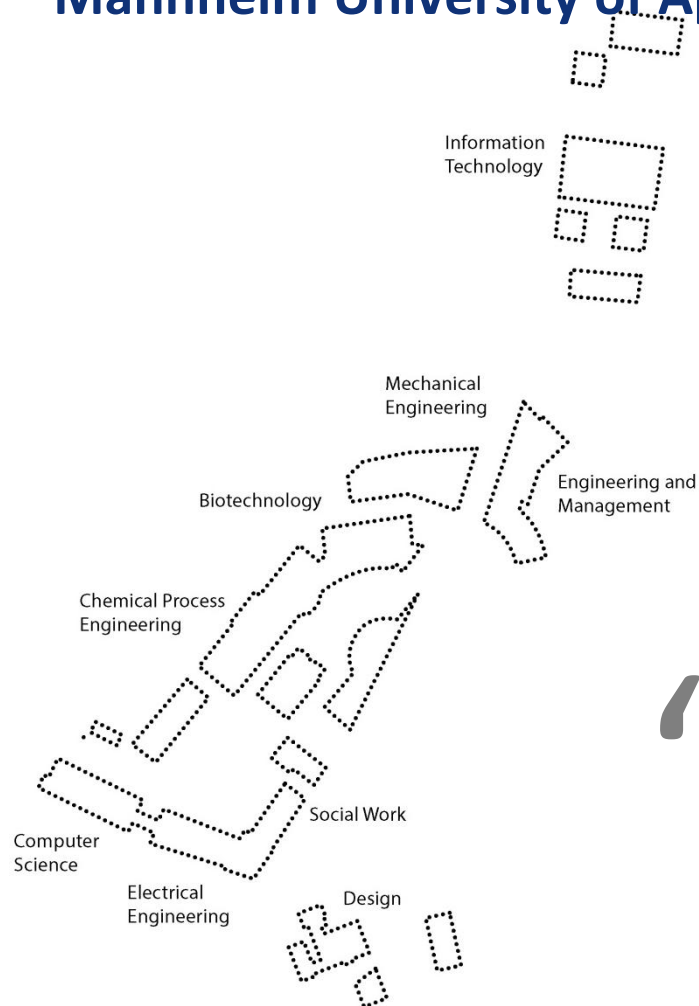
A Practitioner's Report from the interdisciplinary Teaching Project kompass at Mannheim University of Applied Sciences

International Cycling Conference 2017  
Mannheim, 19-21 September 2017





## Mannheim University of Applied Sciences: Profile



### Facts & Figures

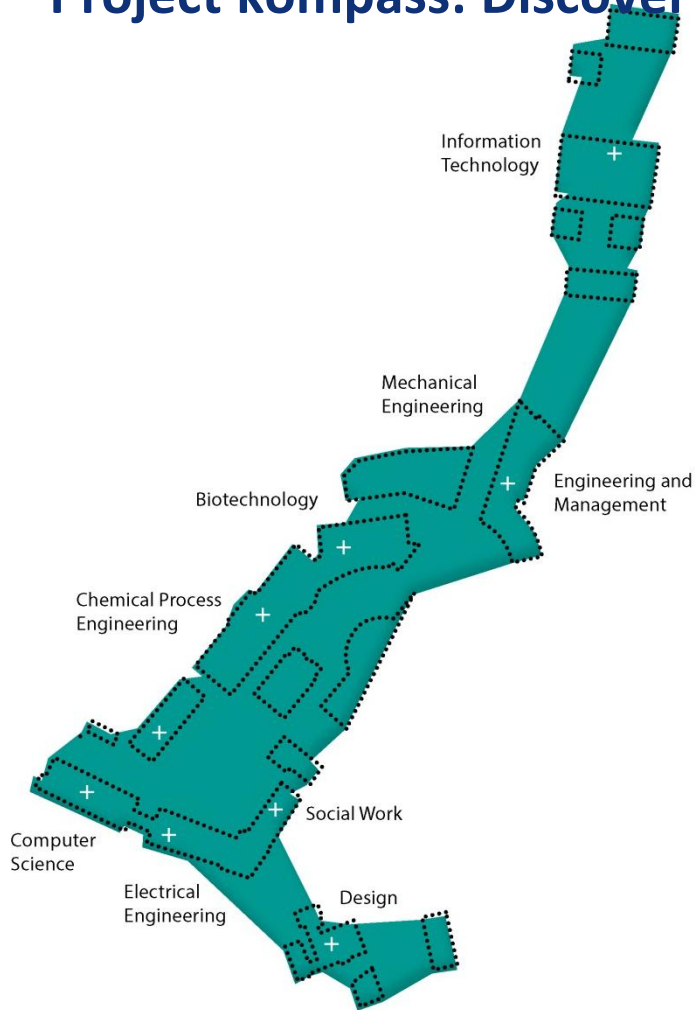
- ⊕ 5.221 students (33.3% female, 13.2% international)
- ⊕ 181 professors , 173 academic staff members
- ⊕ 9 departments
- ⊕ 23 Bachelor programs
- ⊕ 10 Master programs

### Mission Statement

“ For more than 100 years, Mannheim University of Applied Sciences has been anticipating future educational demands. We can look back on a dynamic tradition and commitment to meeting future challenges with innovative educational concepts. ”



## Project kompass: Discover Interdisciplinarity



### Objectives

- ⊕ Fostering interdisciplinary teamwork
- ⊕ Promoting benefits of heterogeneity and diversity
- ⊕ Strengthen efficacy and interpersonal trust
- ⊕ Establishing a shared identity on campus

### Measures

- ⊕ Team matching according to diversity criteria
- ⊕ Open assignments
- ⊕ Enabling students to design and implement concepts: peer coaching, scientific assistance, professional partners, infrastructure
- ⊕ Presentation at public event, expert jury rewards sustainable, innovative and creative concepts





## Bicycle as Teaching Object

- ◉ Introduction to large-scale societal challenges like mobility, sustainability, health, and security
- ◉ Combining approaches, methods, and knowledge from different academic disciplines: technical engineering, economics, social sciences and design
- ◉ Integral Part of students' lifeworld
- ◉ Early prototyping: low-tech procedures, virtual-reality-modelling, or high-end construction techniques
- ◉ Communication Starter, contact to small local business, easy accessible experts



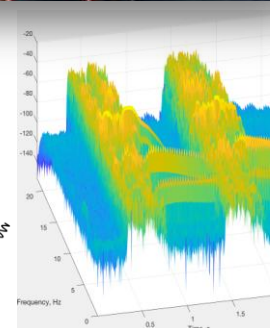
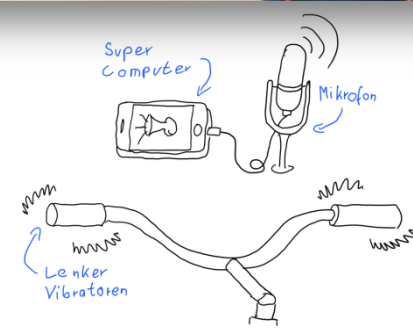
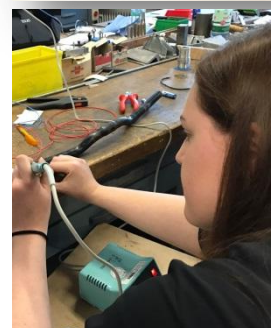
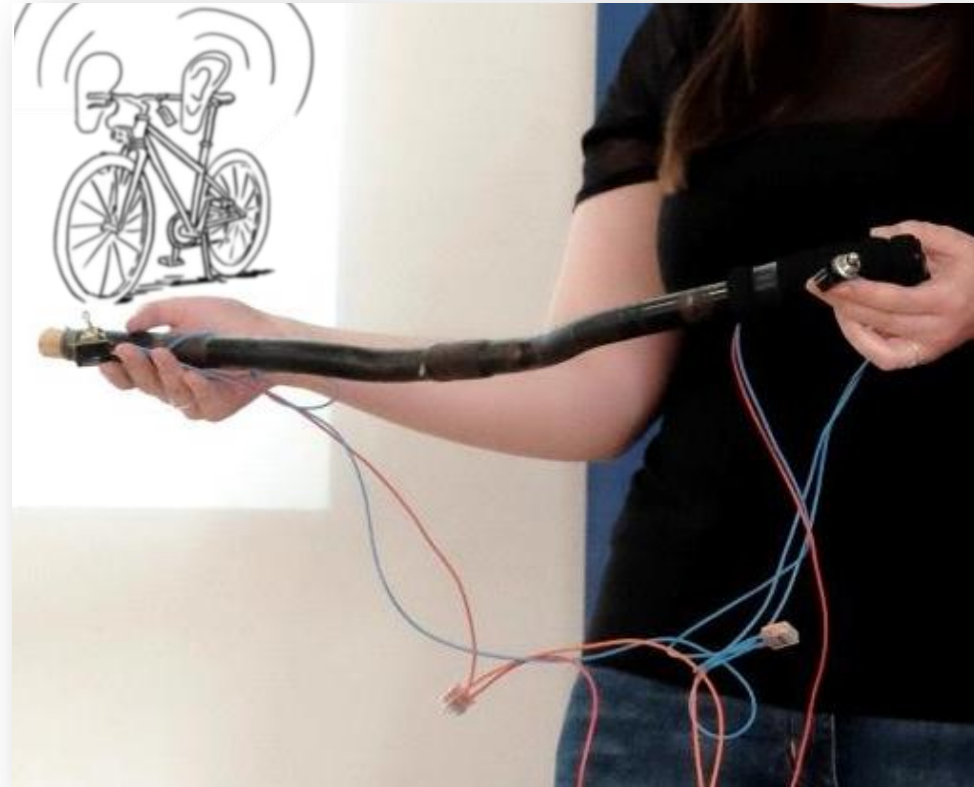
## Student Project "Hearing Bike"

### Concept

- Facilitating bike rides for people with hearing impairments
- Acoustic signals captured by sound recognition software, translated into vibrations of handle bars

### Practice of Technical Skills

- Expert interviews with target groups
- Identification of use cases
- Sound pattern analysis
- Micro processor programming
- Soldering of vibrators







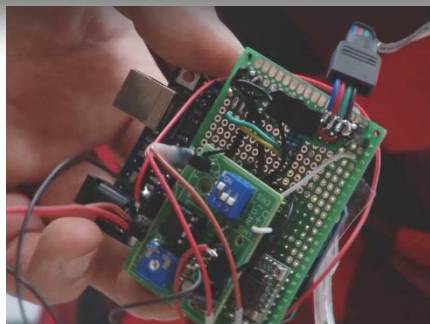
## Student Project "Emergency Bike"

### Concept

- ⦿ Light and manoeuvrable vehicle for first responders with capacity to carry emergency equipment
- ⦿ Quick access in rough terrain to people in need of medical assistance

### Practice of Technical Skills

- ⦿ Expert interviews with Red Cross
- ⦿ Connection of LEDs and siren
- ⦿ Energy supply
- ⦿ Micro processor programming
- ⦿ Virtual Engineering







## Training of Soft Skills

- ⦿ Shared understanding of the problem
- ⦿ Getting to know different disciplinary approaches
- ⦿ Developing academic identity
- ⦿ Defining goals, setting benchmarks
- ⦿ Communication competences, presentation skills
- ⦿ Group dynamics





## Measuring Skills (Summer Term 2017)

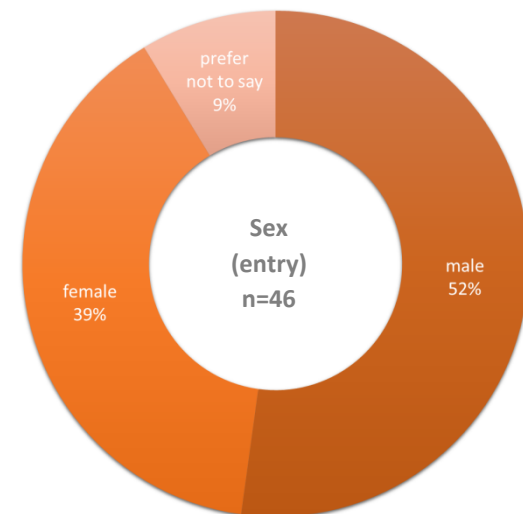
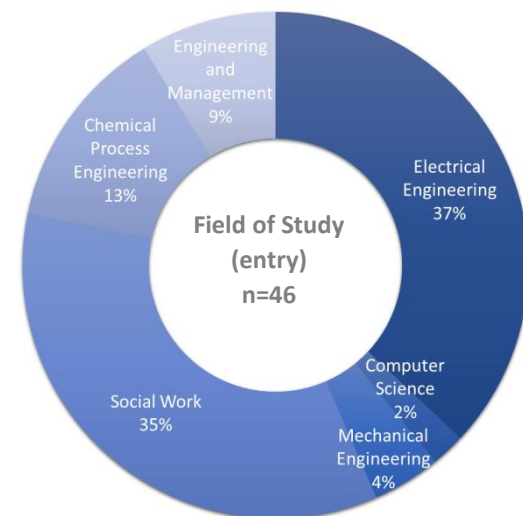
Self assessments of relevant aspects of personality, efficacy, motivation, interpersonal trust, and commitment to study programme and Mannheim University of Applied Sciences

### Method

- ⊕ web survey conducted in two waves: Beginning of programme (entry) and last week of programme (exit)
- ⊕ both questionnaires comprising identical items
- ⊕ construct validity of measures statistically tested
- ⊕ Analysis by comparison of means (entry v. exit)

### Caution!

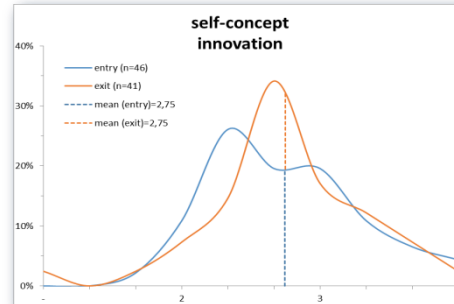
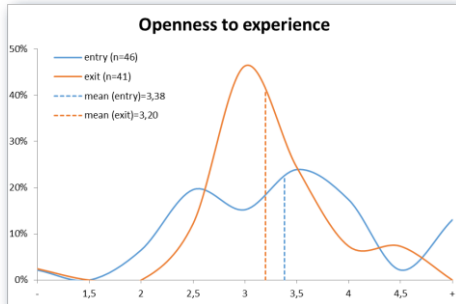
Effects may not be attributed monocausally to participation in the programme!



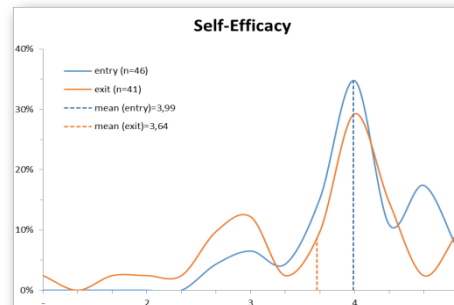
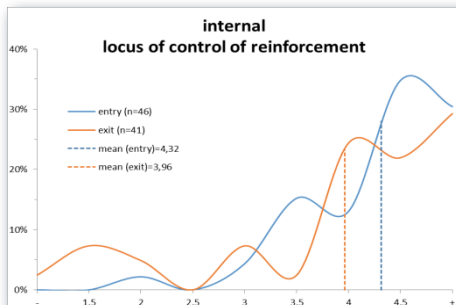




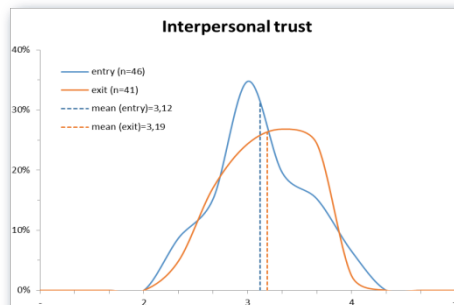
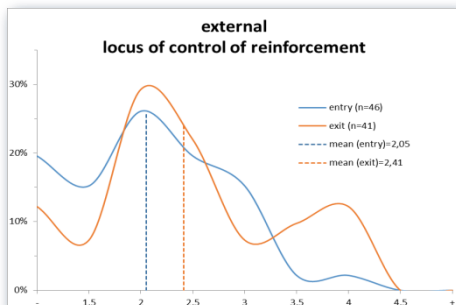
## Findings & Discussion



- ⊕ **Entry Survey:** high levels of confidence and motivation
- ⊕ **Exit Survey:** slightly lower ratings on positive personality aspects
- ⊕ But: „Harmonizing effect“ of distribution on all dimensions



- ⊕ **Entry Survey:** great belief in ability to handle problems alone
- ⊕ **Exit Survey:** increased belief in dependence on others
- ⊕ But: Stronger social trust



Indication of growing recognition of the importance of teamwork?



## Participants' Feedback (Summer Term 2017)

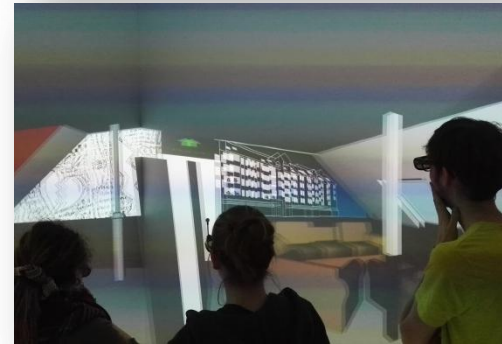
“At the beginning, I would have never expected to be able to **get such a project up and running** with a bunch of people that didn't know each other.

“I was really stunned to realize how easy it can be to get something done if only you can **rely on a great team!**

“I'm a student of Social Work. kompass was beneficial because I could apply my skills in **project management and teamwork** practically.

“I entered kompass with pretty low expectations. Now I am positively surprised, **how valuable this experience** has been for me personally. Even if the project was quite exhausting at times.

“The insights into other fields of study have been very interesting and I enjoyed **meeting new people**. You rarely get the chance to do so. Taking part in kompass has certainly **improved my openness** to social interactions.







hochschule mannheim

# kompas

## Thank you for your attention.



Vogt, Ludgera & Bandtel, Matthias (2016).  
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Springer VS.

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