



Technikdidaktik

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# Knowledge Work in Aircraft Maintenance

The education in the fourth industrial revolution

**XII Guide Conference**

3rd and 4th May 2018

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# Outline

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- 1 Theoretical reference points for knowledge work
- 2 Empirical research findings
- 3 Conclusions

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# Theoretical reference points for knowledge work

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Knowledge work is an activity that ...

- requires independent acting in situation adequate decision processes
- requires routine which, however, needs to be modified, extended and exceeded
- is implemented in a broad domain field and is hardly structured
- is continuously in need of both intelligent application and implementation of new knowledge

# Theoretical reference points for knowledge work

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Task-related characteristics of knowledge work (Hube, 2005):

## 1. Novelty of tasks / subtasks

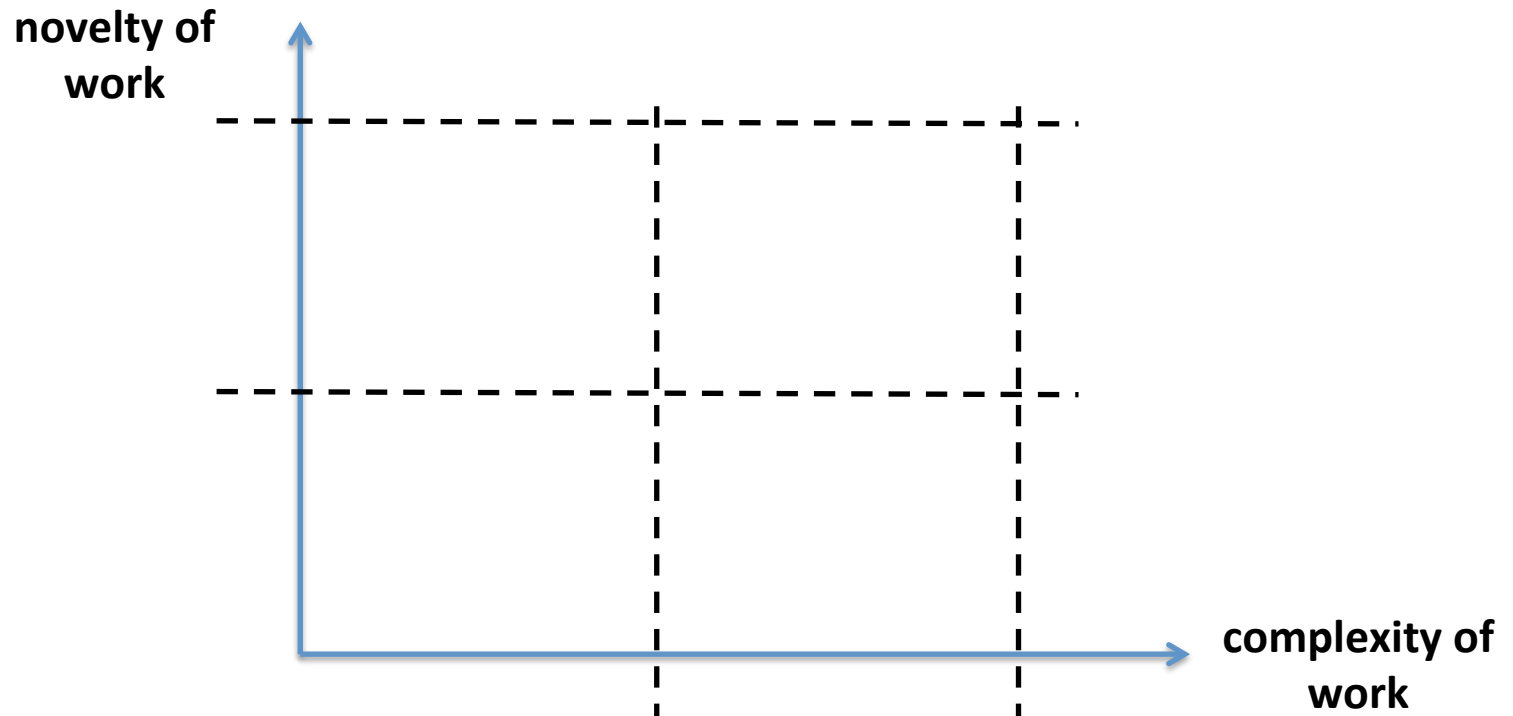
- Lack or transgression of routines (e.g. cognitive)

## 2. Complexity of tasks / subtasks

- Device, operational context, administrative context, responsibility
- Problem solving, communication & cooperation, learning requirement, dynamics

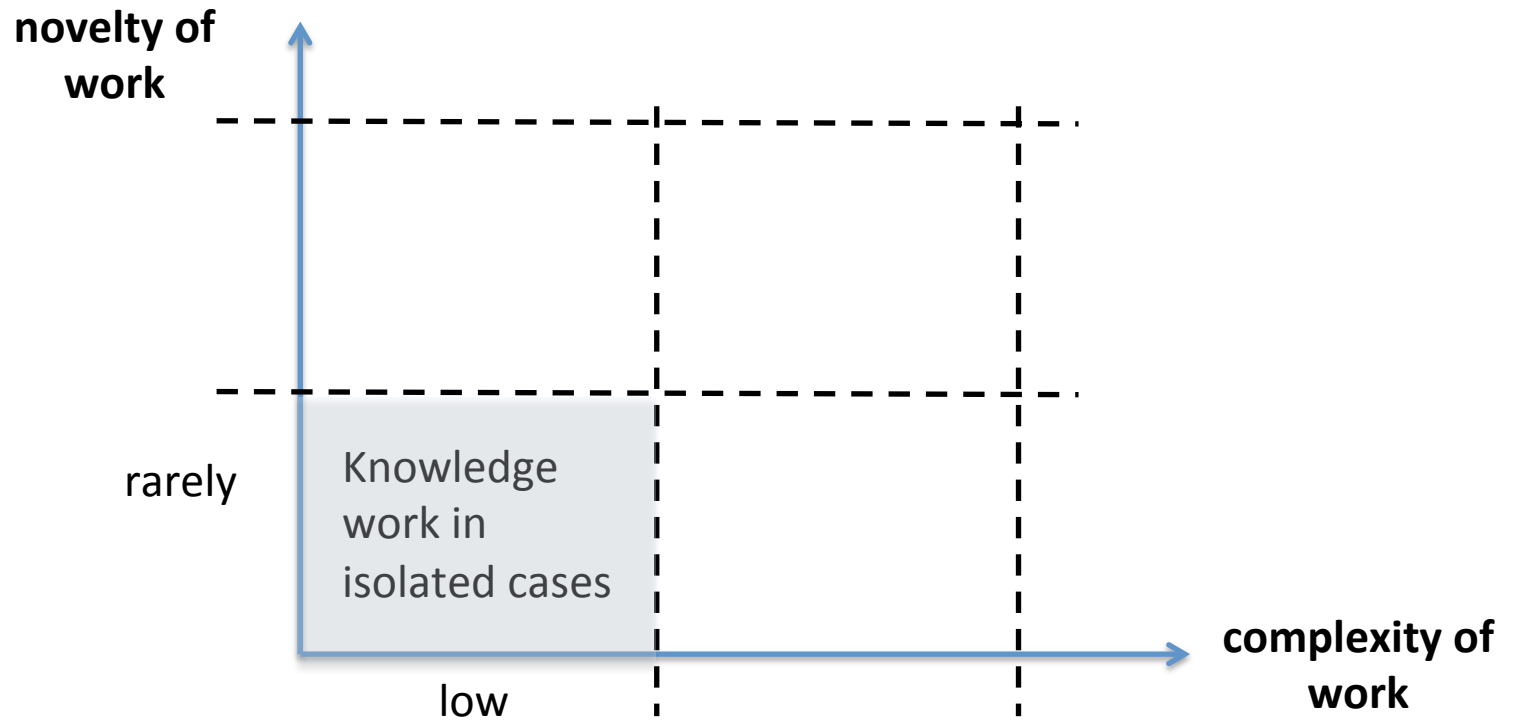
# Theoretical reference points for knowledge work

Characteristics of knowledge work (Hube, 2005)



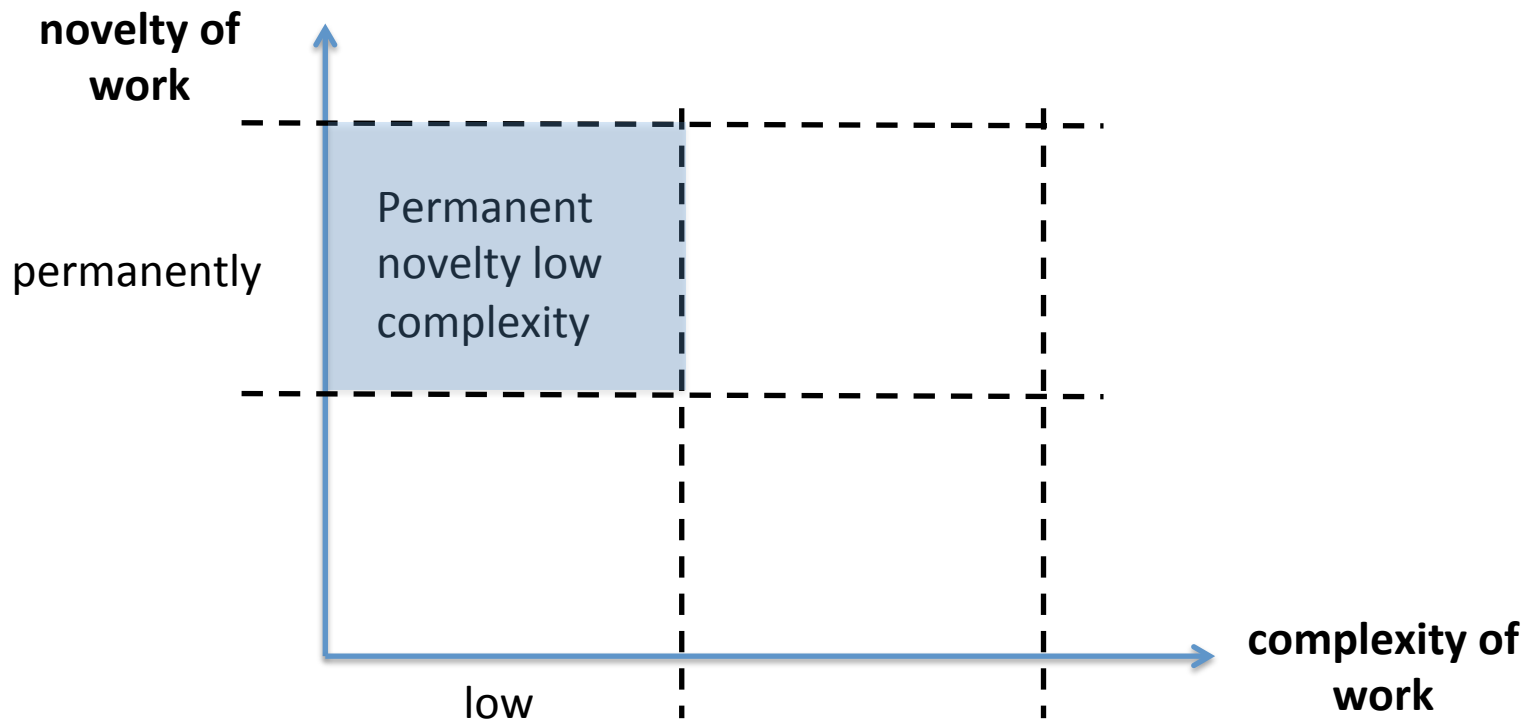
# Theoretical reference points for knowledge work

## Characteristics of knowledge work (Hube, 2005)



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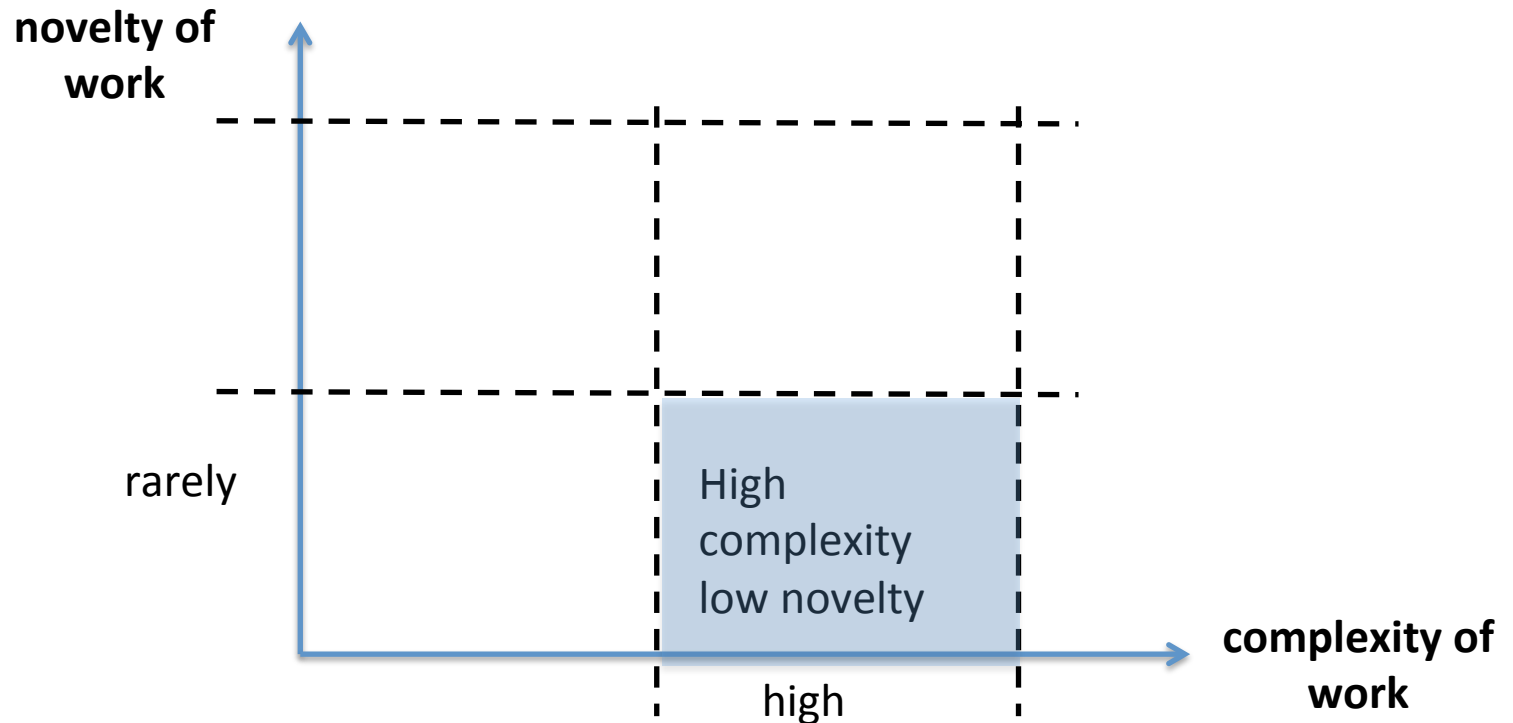
## Characteristics of knowledge work (Hube, 2005)





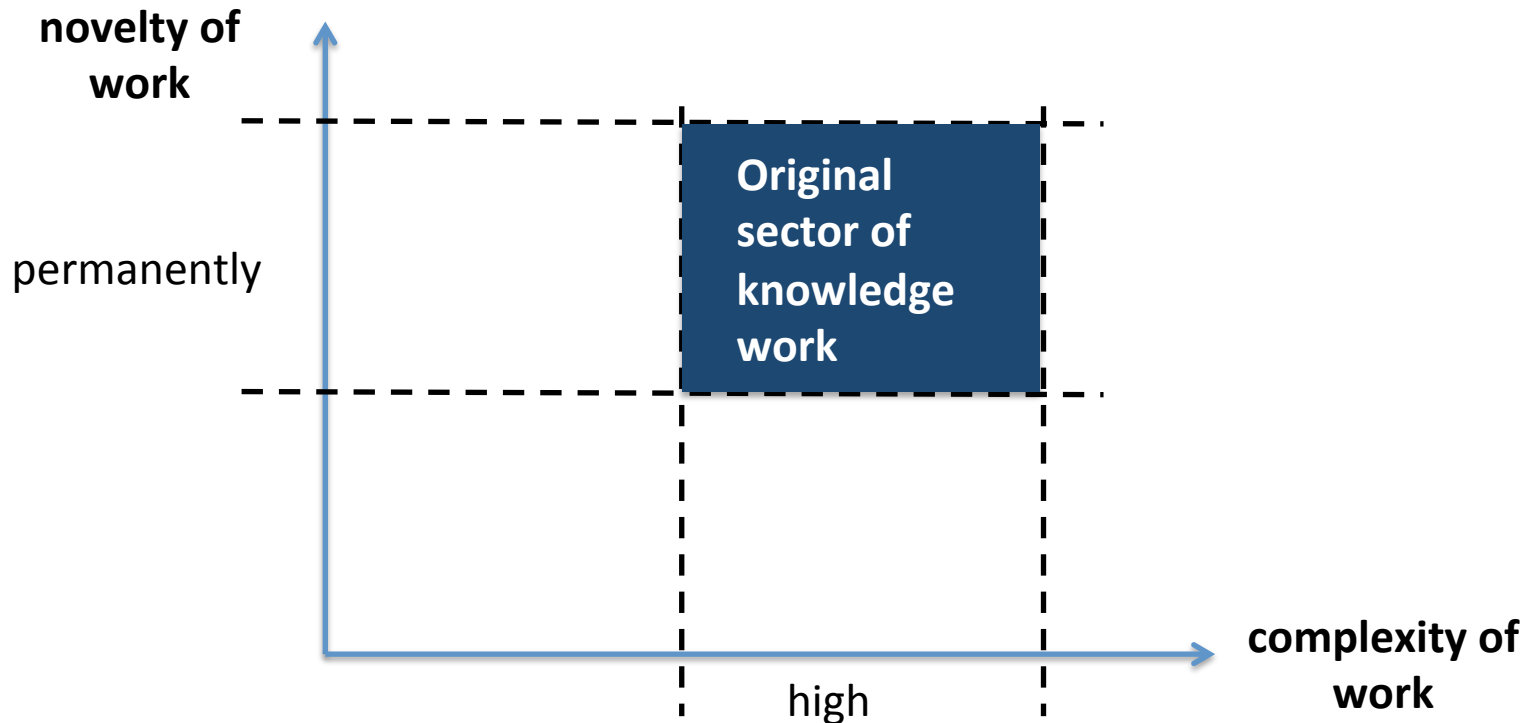
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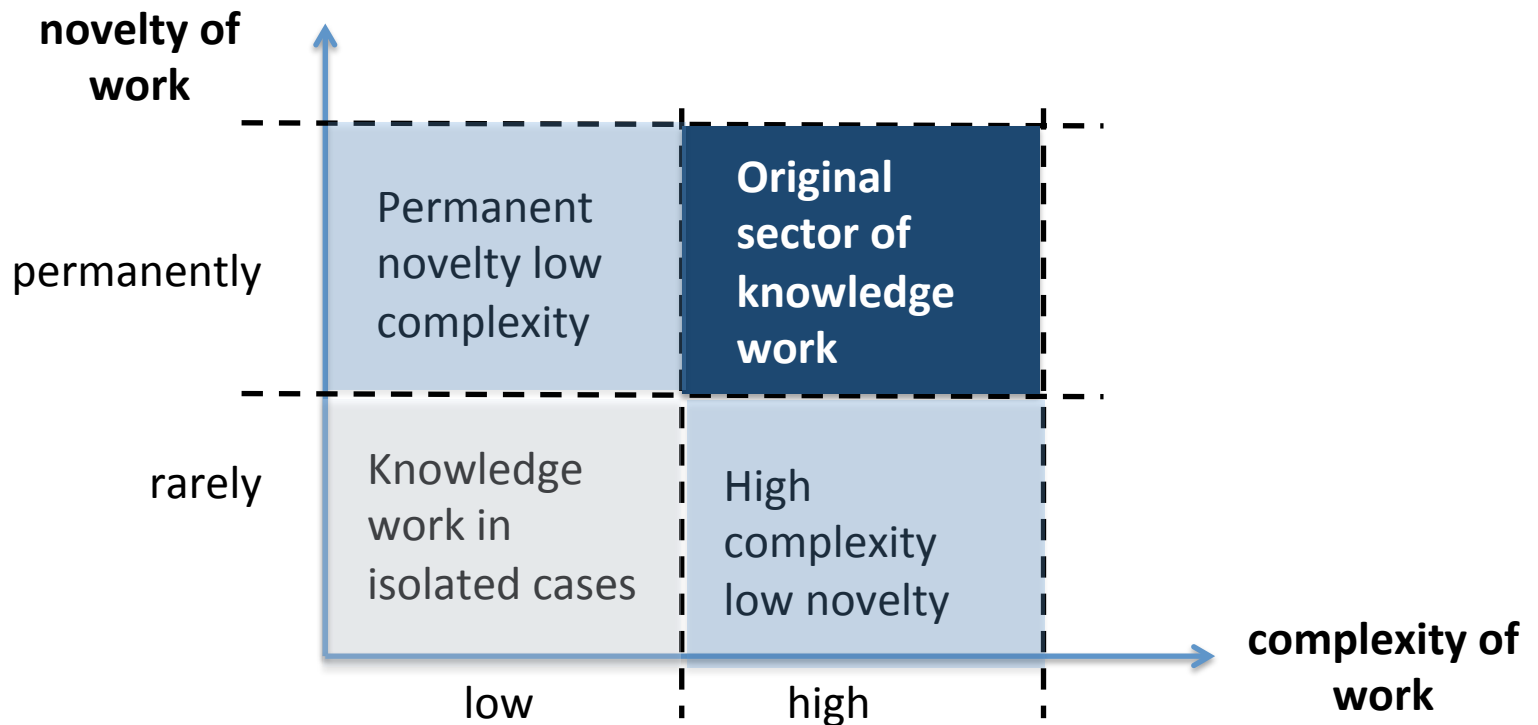
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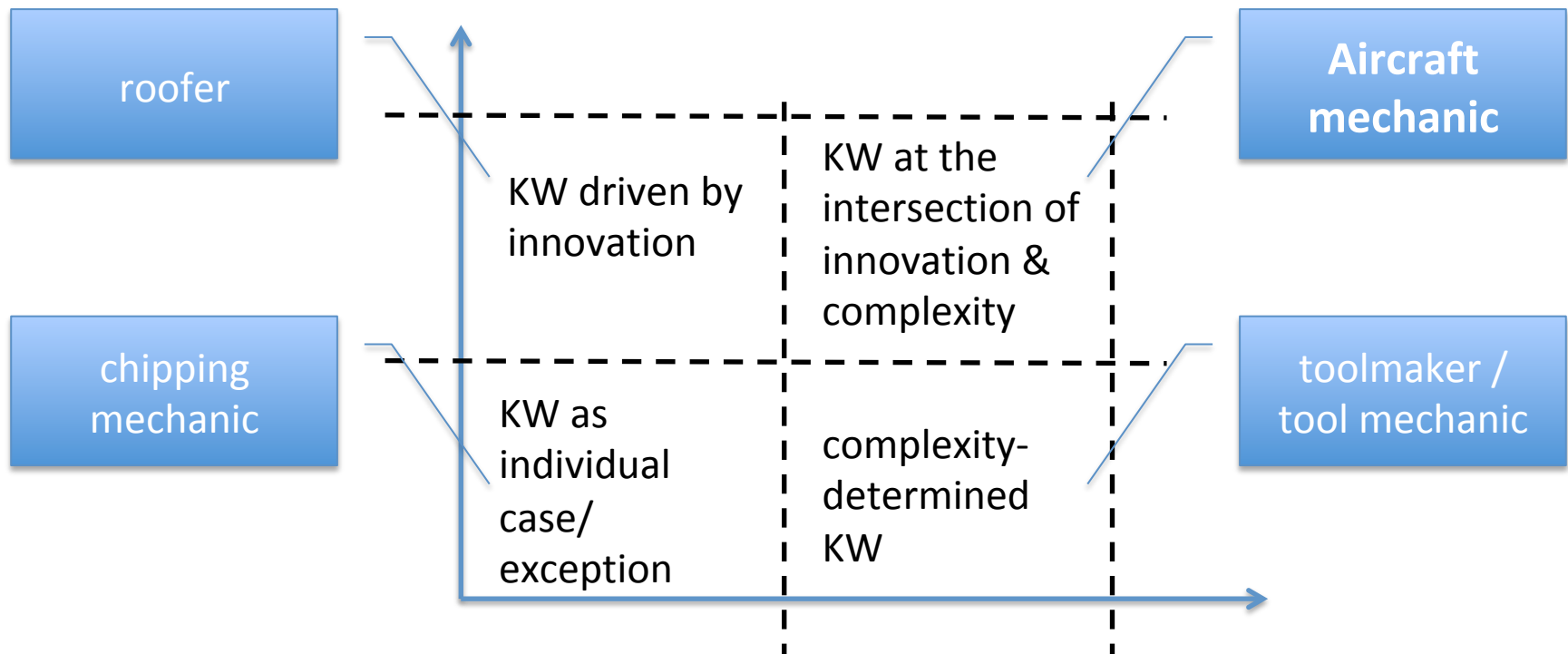
# Theoretical reference points for knowledge work

## Characteristics of knowledge work (Hube, 2005)



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# Theoretical reference points for knowledge work

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## Task-related characteristics of knowledge work (Hube, 2005):

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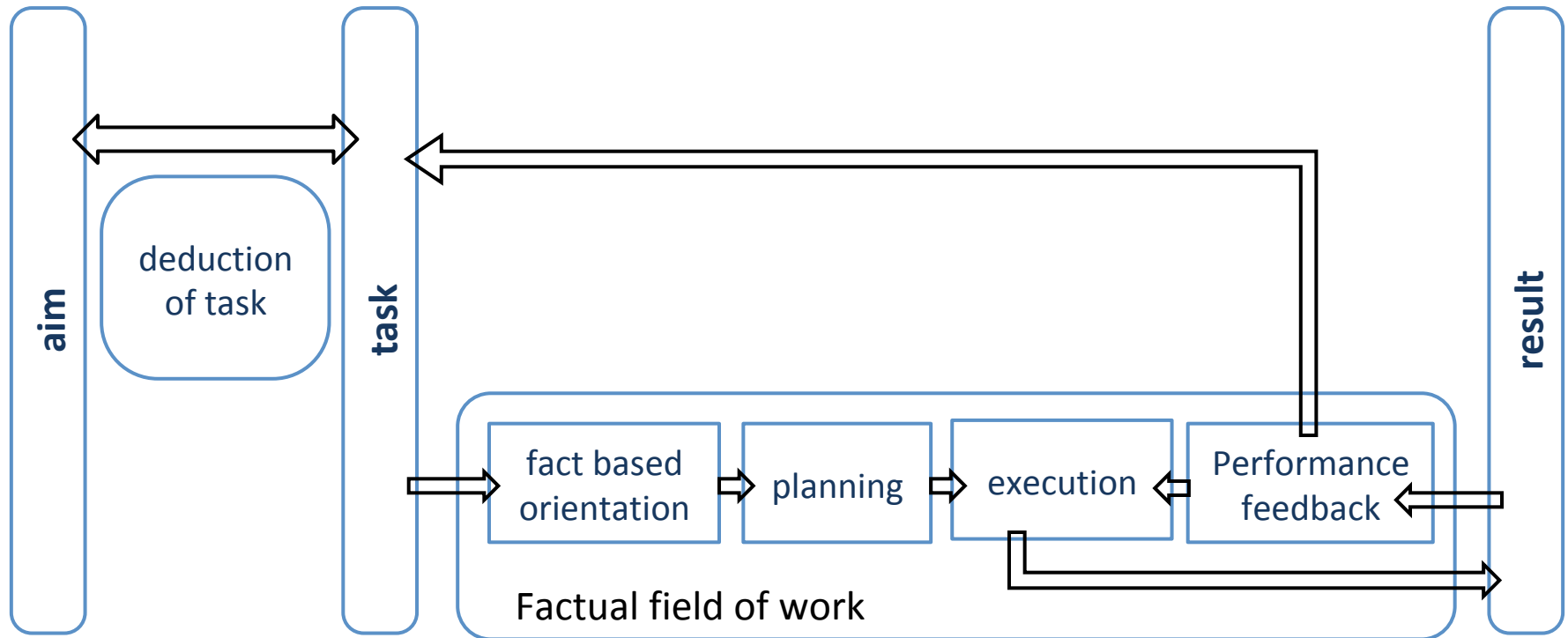
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### 3. Twofold field of action:

- Regulation of the factual field of action with the help of a reference field of action

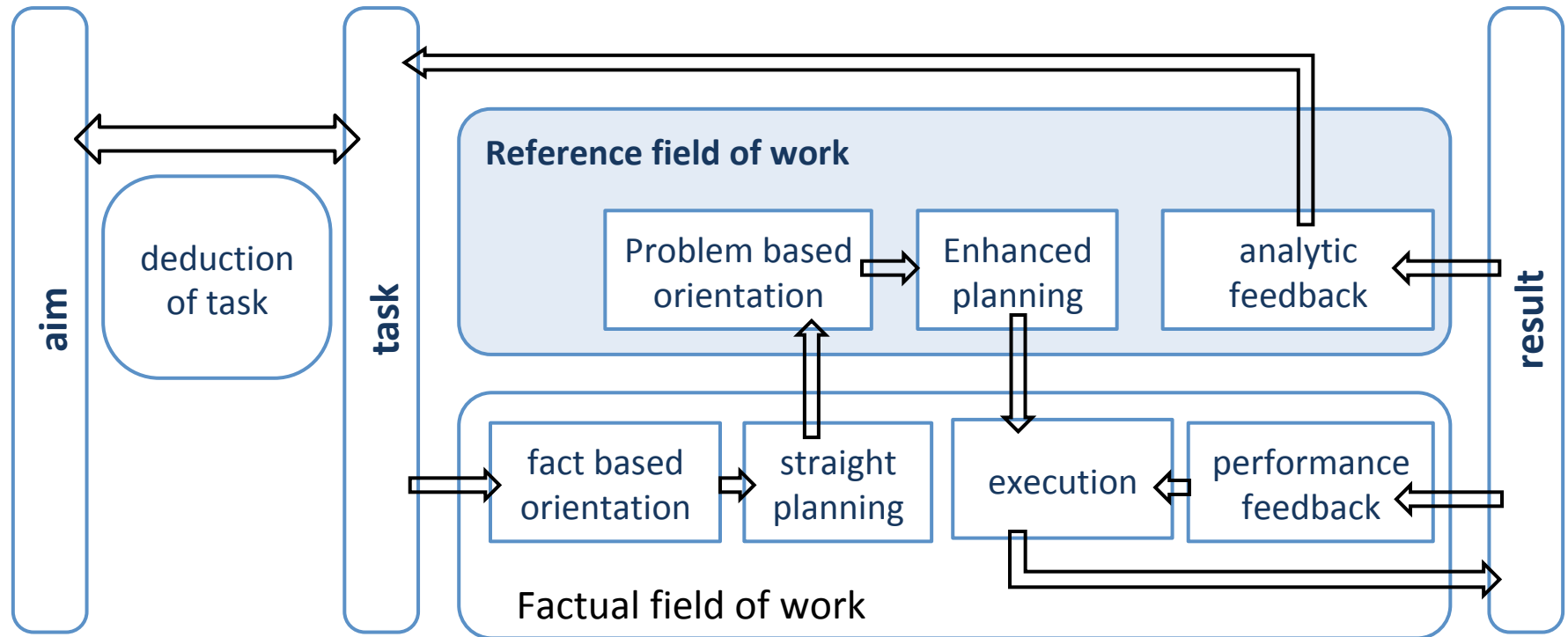
# Theoretical reference points for knowledge work

## Process model for routine work (Hube 2005)



# Theoretical reference points for knowledge work

Process model for knowledge work (Hube 2005)



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# Empirical research findings

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## Research questions

- Comparison of KW + aircraft mechanic's actual job
- Mechanics' description + perception of KW

## Field of research + research cohort (2015)

- Service headquarters in + outside of Germany

## Methodological approach

- Qualitative-explorative approach
- Interviews (n = 33)

# Empirical research findings

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Distinctive answers of aircraft mechanics about their work:

- KW ist quite natural
- The percentage of KW increase continuously
- For a minority, seeking and transforming of information is a kind of unavoidable work-support
- Work at the real device is more pleasant, easier and less burdensome
- Information flood... information chaos

# Empirical research findings

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Special results about knowledge Work:

- Activities of aircraft mechanics meet the three basic KW criteria
- Activities alternate continuously between the factual field of work and the reference field of work
- Most striking findings concern
  - complex communication and cooperation structures
  - continuous need to learn
- Safety issues have a reference level and need clarification
- Basic preconditions: interest and motivation  
→ high level of cognitive stress

# Empirical research findings

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## Aircraft mechanics...

- need well-anchored basic knowledge embedded in technical work activities.
- continuously need to acquire, transform, and use new knowledge.
- are permanently in between applying, reflecting on and relativizing basic competences.
- are mechanically skilled, intelligent, socially competent, have technical understanding, good communication skills, and are eager to learn.
- need a workplace that supports alternating between the factual field of work and the reference field of work.

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# Conclusions

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... for the work and workplace of aircraft mechanics

- Optimal, easily accessible information systems
- Immediate use of mobile end devices
- Safe and verified data that is easily retrievable
- Cognitively manageable work segments
- Reliable team and cooperation structures
- Knowledge management systems with upstream information support

# Conclusions

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... for the learning and instruction of aircraft mechanics

- In training:
  - acquiring and transforming information
  - problem- solving
  - practicing and reflecting on team communications skills
- Career entry: work should start moderately on both the factual level and the reference level
- Mentors or coaches can be important
- Further education in accordance with the actual job

# Thank you!

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