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The Development and Use of Industrial Robots – the Educational/Work Science Perspective (part 1)

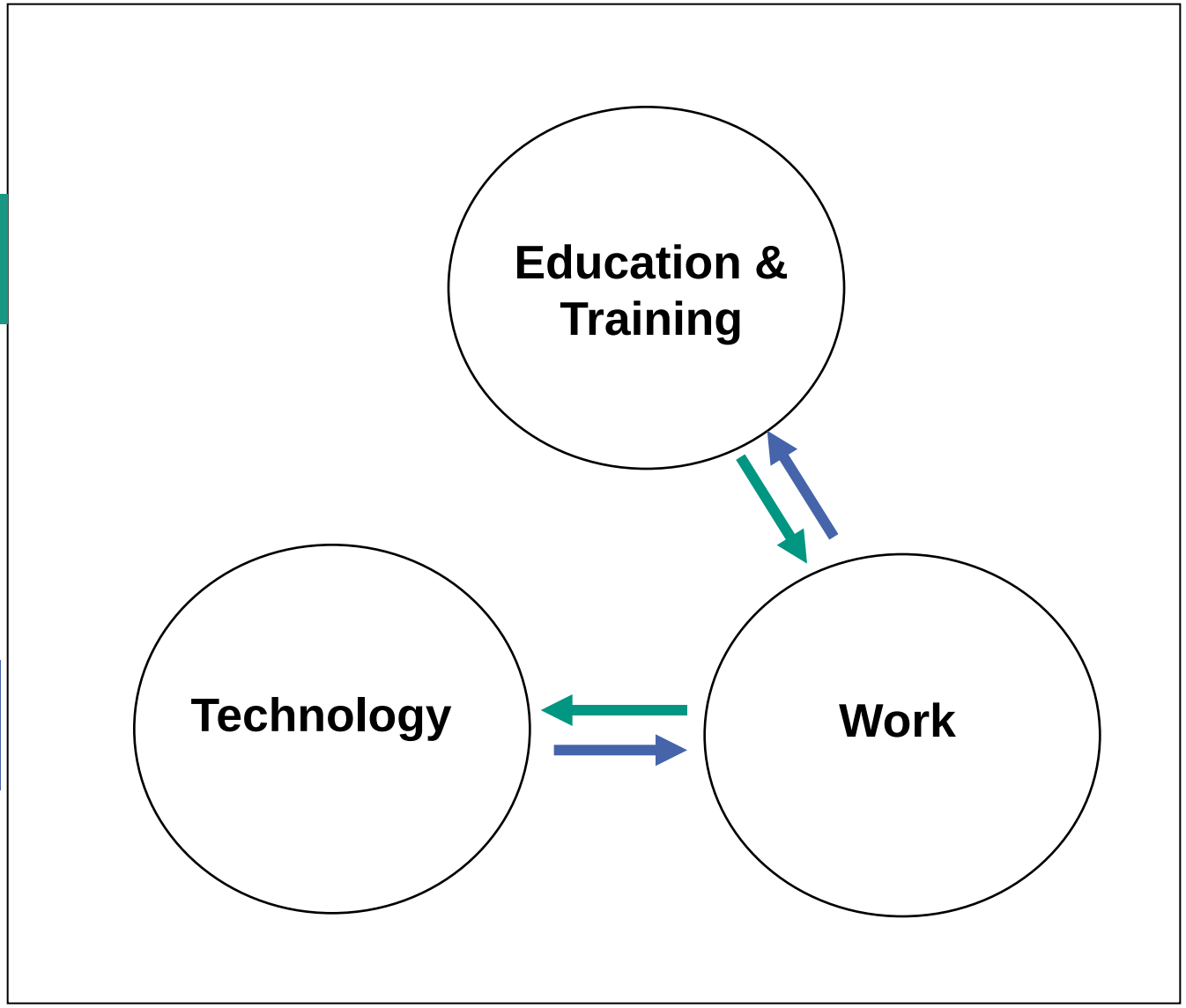
Outline

- Aproaches in technology development
- Human-robot interaction
- Human-robot division of functions
  - Organisation of societal work
  - Task-oriented design perspective
  - Information technology design perspective
- Conclusion

Industrial Robots: Education & Work Science
Perspectives in technology development

Human centred perspective

Technology centred perspective



HRI

covers the joint action of humans and robots, as well as the differences in such action, and also the physical interaction of humans and robots;

deals with the communication between humans and robots relating to jointly perceived objects;

deals with ways of perceiving thr „relationship“ between humans and robots;

addresses the relationship between robots and humans whose (service) tasks have been partially or entirely replaced by robots and who may possibly still be active within a shared work system with the robot.

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Human-robot division of functions considers

the organization of societal work (such as the different employment and professional profiles of employees, recruiting and training practices, hierarchy of professions etc.),

the work tasks to be performed by humans and robots (such as handling, monitoring or decision-making tasks)

the possibilities and the limitations of realizing such tasks by means of information technology (depending, for example, on the motoric capabilities, perception and cognition of the robot).

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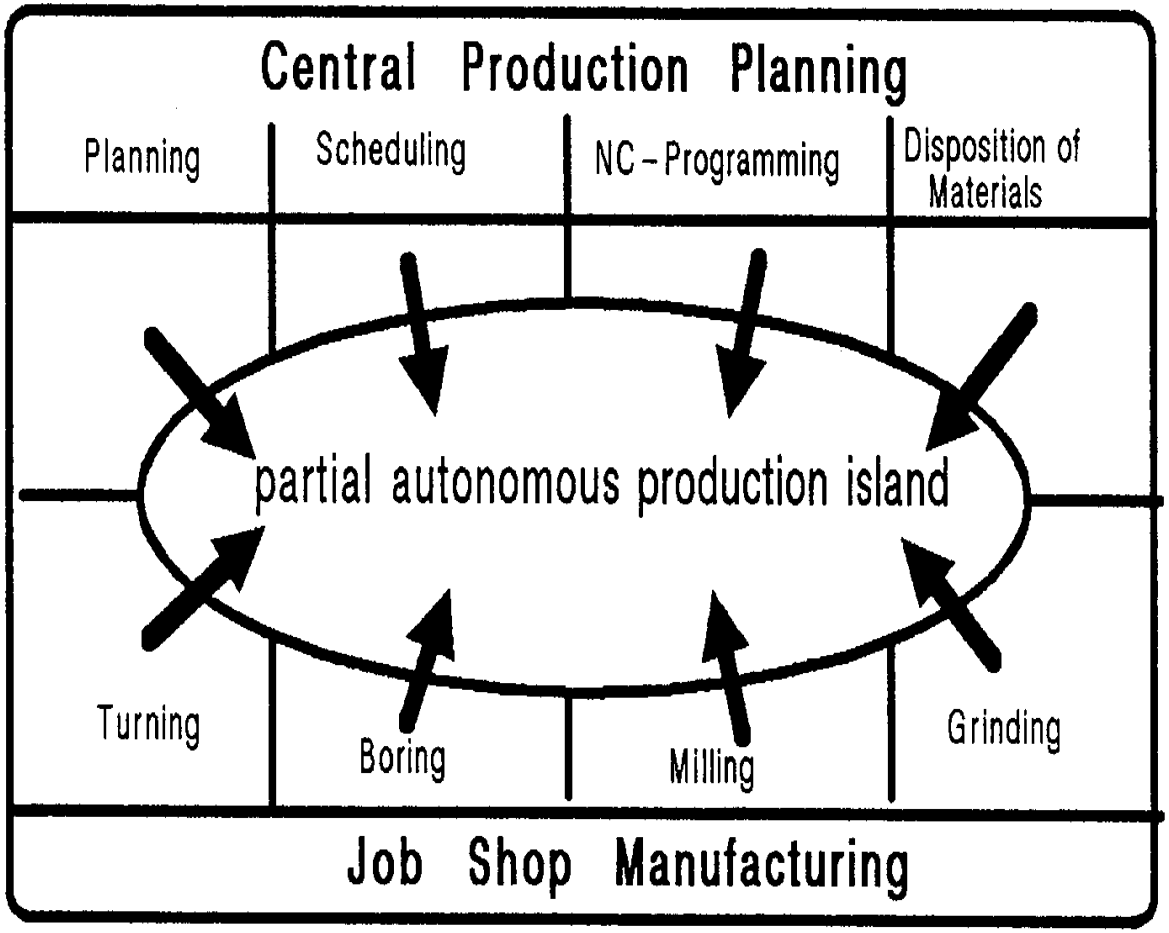
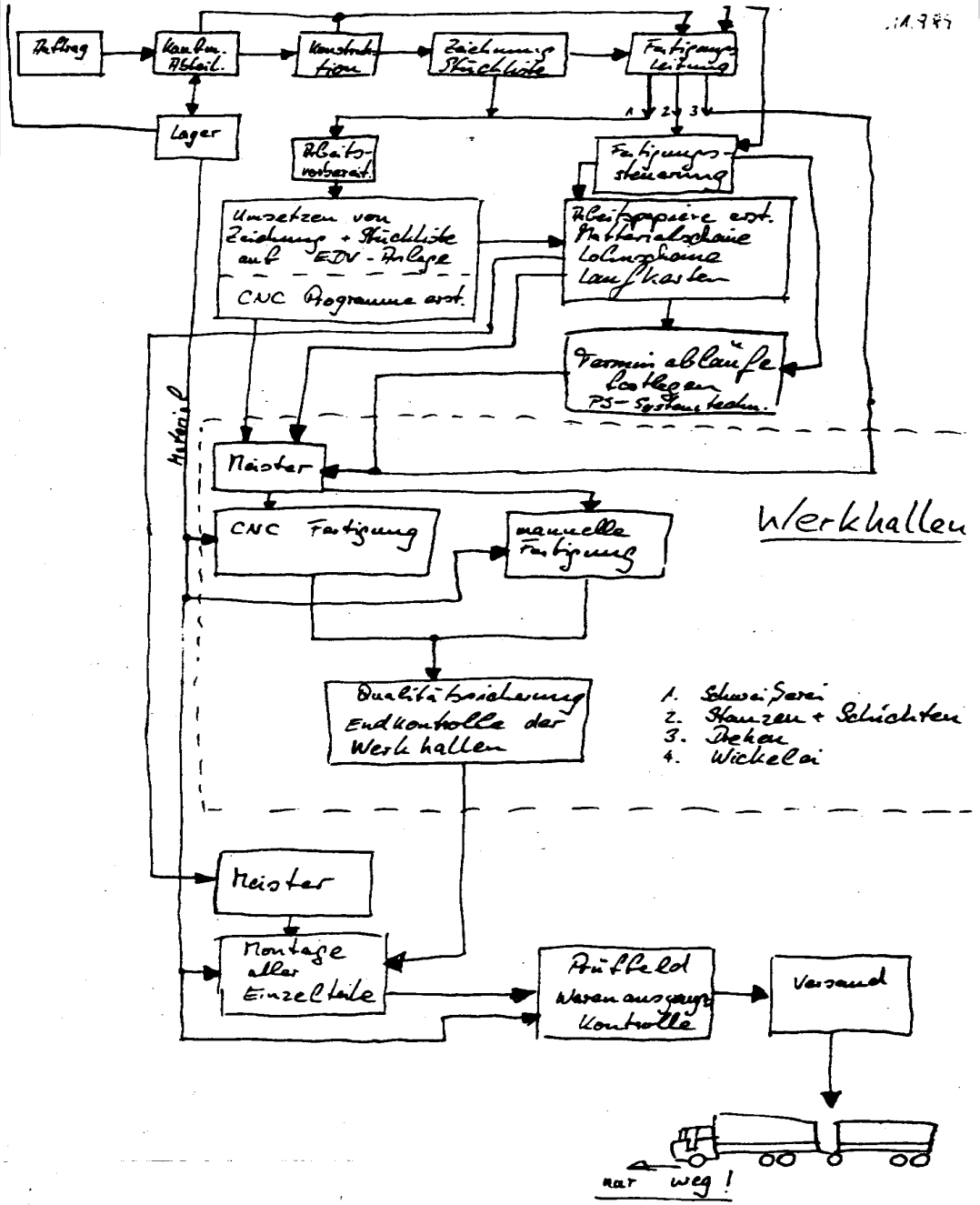
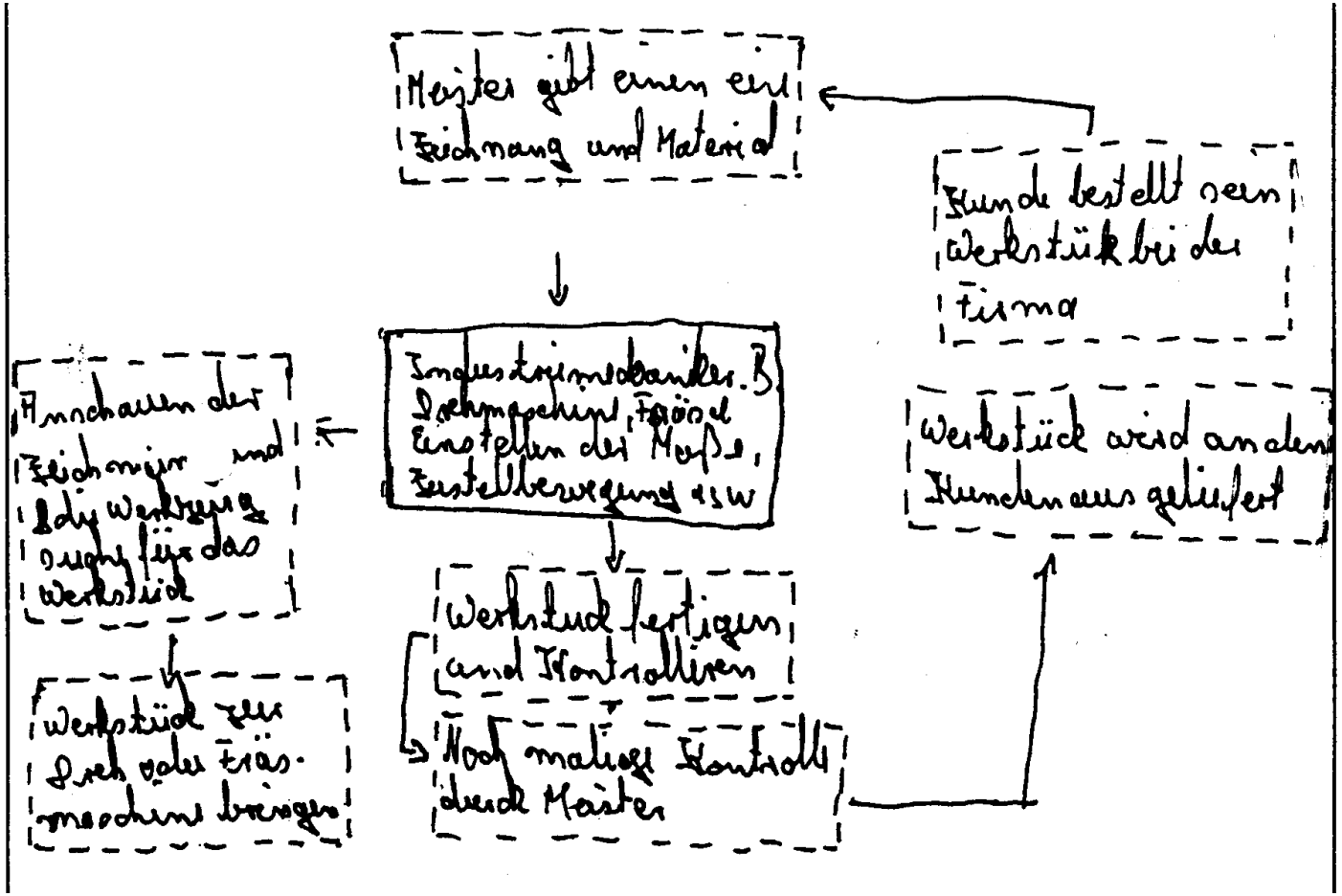
Availabilty of skilled work?





Quelle: Fischer, M: Von der Arbeitserfahrung zum Arbeitsprozeßwissen. Opladen: Leske + Budrich, 2000, S. 203



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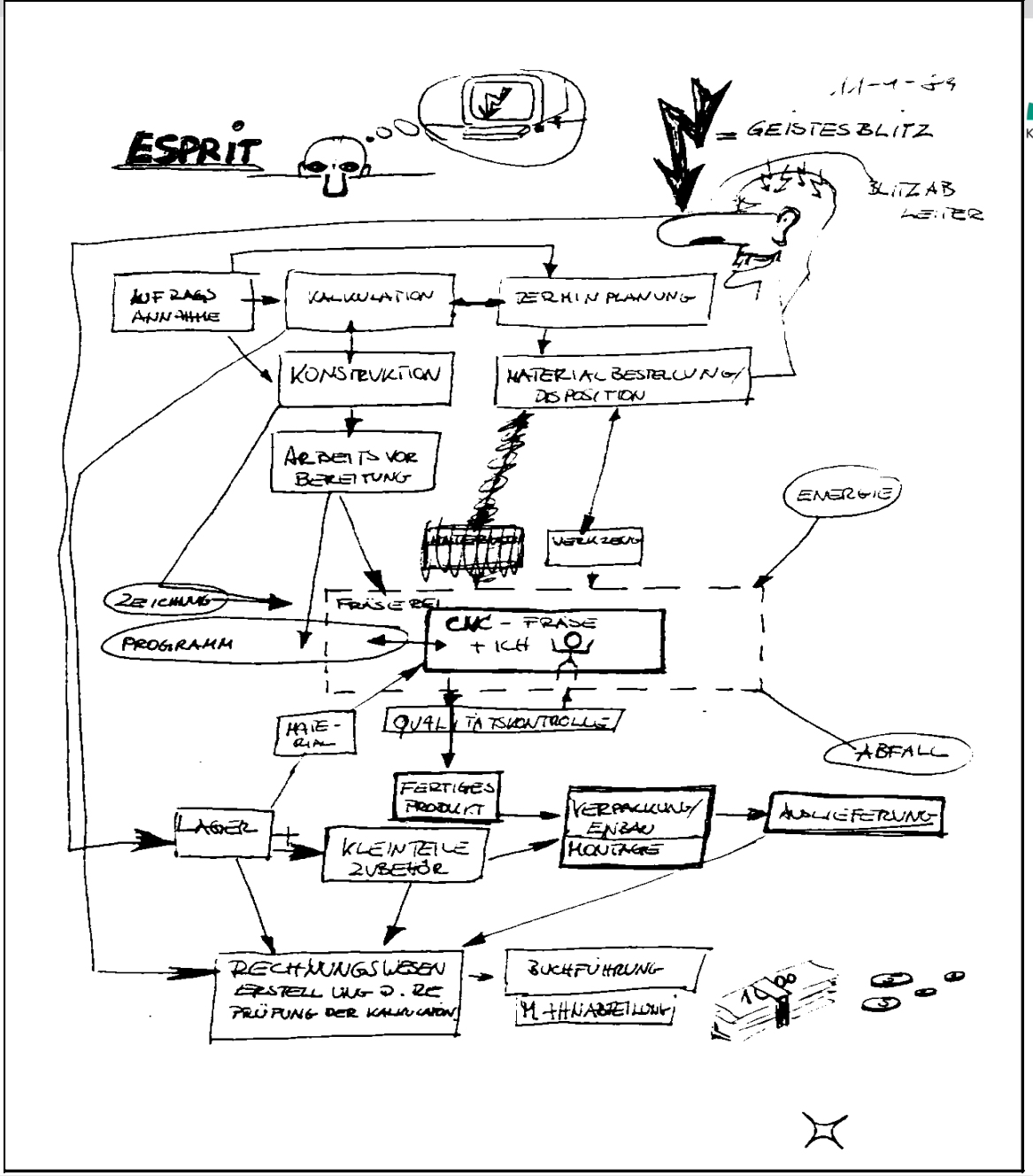


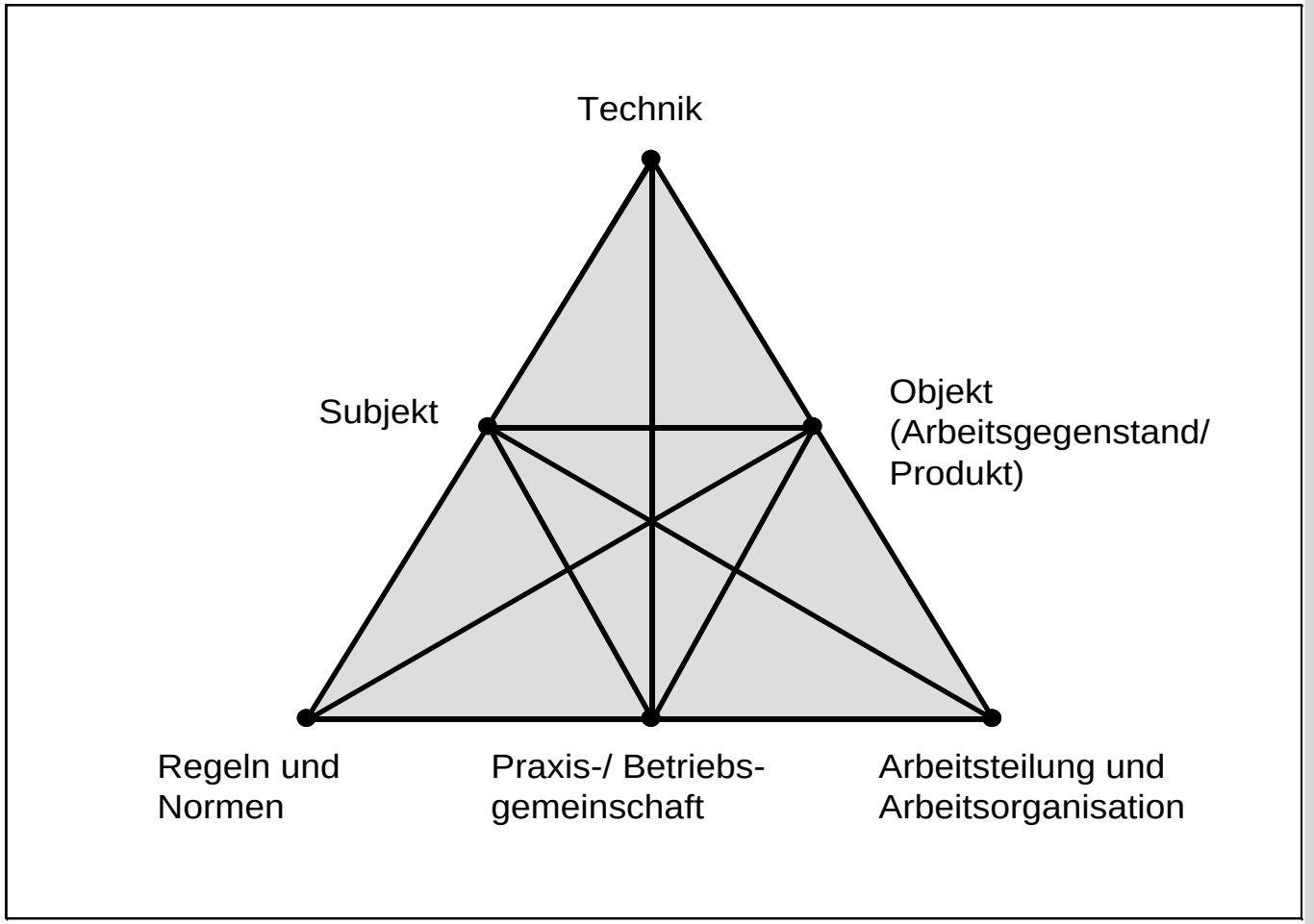
Quelle: Fischer, M: Von der Arbeitserfahrung zum Arbeitsprozeßwissen. Opladen: Leske + Budrich, 2000, S. 203

Work process knowledge

immediately useful for the work to be done (e.g. skilled worker's "know how" in contrast to "know that" which is learned in vocational schools and is derived from the engineering sciences);

mostly (although not exclusively) constructed in the workplace through experience and work itself,

an understanding of the whole work process including preparation, action, control and evaluation.



Contrastive task analysis

Safety problems due to the lack of self reflection by robots

Information processing capacities of robots

Robots acting under conditions which are uncomfortable for humans

A hierarchy of decision making athorities should be implemented

Conclusion

Consider the societal organisation of work: Is skilled work available and can the acquisition of work process knowledge be supported?

Contrastive task analysis

Usability criteria adapted to the target group