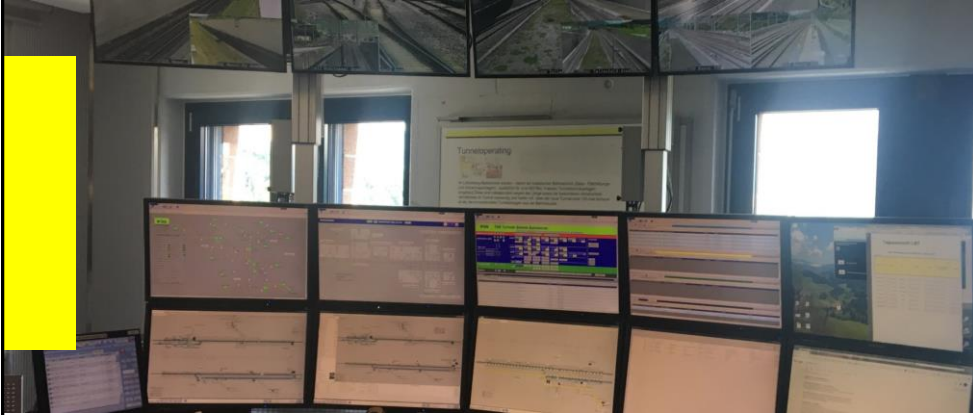


Identification of Training Topics for the Improvement of the Relevant Cognitive Skills of Technical Operators in the Railway Domain



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Background of the study:

- Technical Operators (railway):
Supervision and management of
 - railway power grid
 - railway tunnels



Background of the study:

- Technical Operators (railway):
Supervision and management of
 - railway power grid
 - railway tunnels
- Highly automated technical systems
- Checklists



(Hollnagel, 2014; Schulman, 2013)

06.12.2019

3

Theoretical Background



(Manzey, 2012)

06.12.2019

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Goals of the study

1. Identify the **cognitive skills** relevant for the execution of the job
2. Define which **topics** should be addressed by the **training** of these skills



06.12.2019

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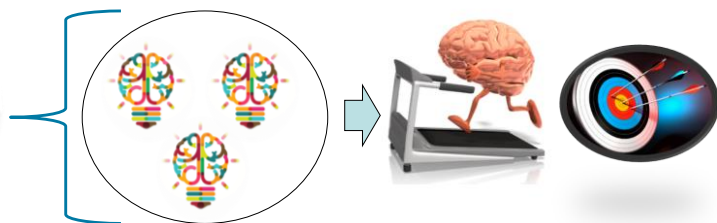
Qualitative design

Observational Interviews



(Ulich, 2011)

Cognitive Task Analysis



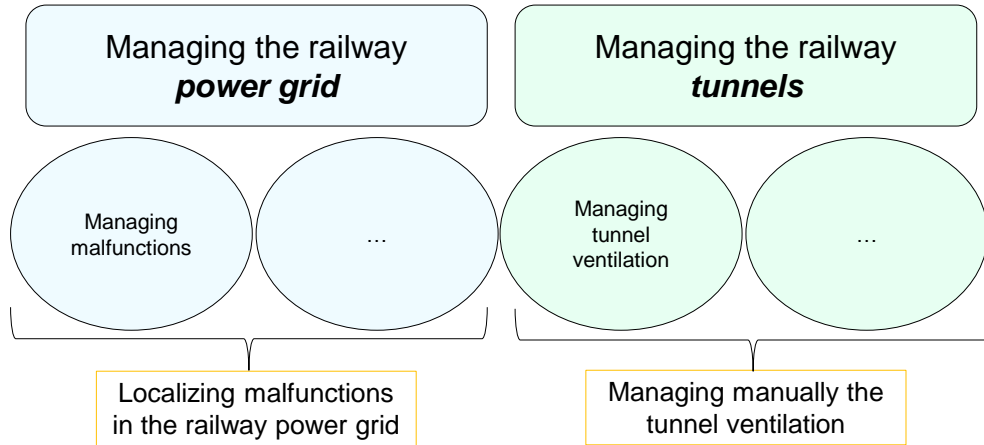
(Stanton et al., 2017)

06.12.2019

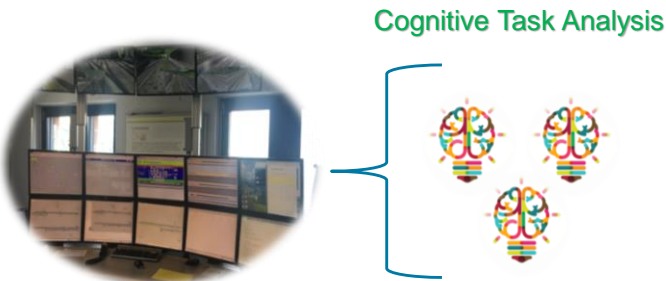
6



Most demanding tasks identification:



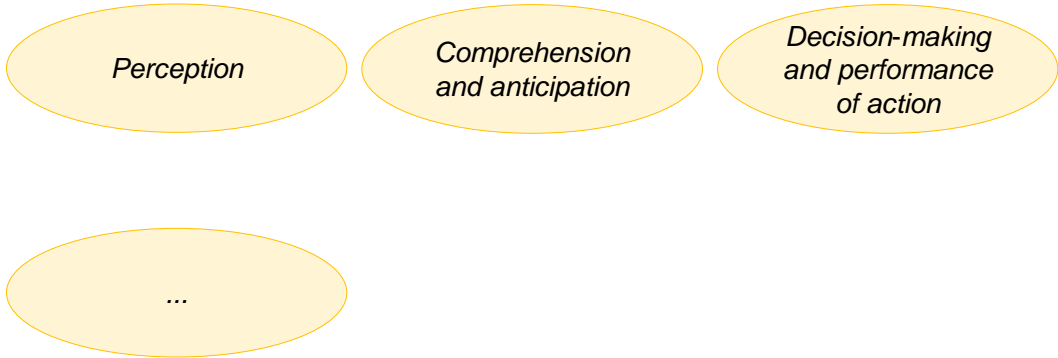
Qualitative design



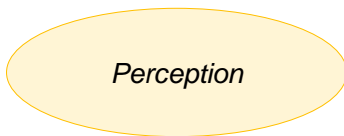
(Stanton et al., 2017)



Cognitive Task Analysis (CTA):



Cognitive Task Analysis (CTA):





Cognitive Task Analysis (CTA):

Perception

How much essential information for the execution of this task be perceived?




Communicating with other persons to find information that is missing in the technical system



Cognitive Task Analysis (CTA):

Comprehension and anticipation

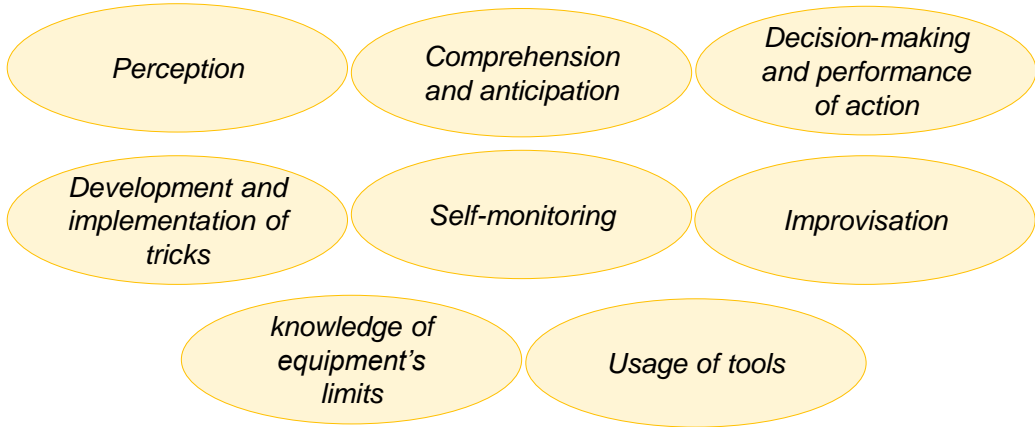
How can an essential information for the execution of this task be understood?



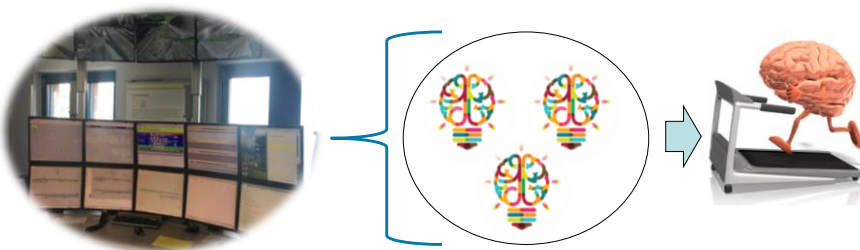
Communicating with other railway organizations to have a better understanding of the situation



Cognitive Task Analysis (CTA):

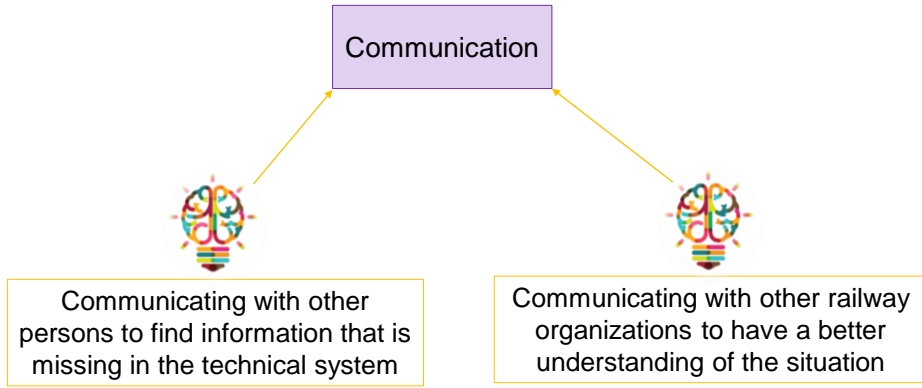


Qualitative design

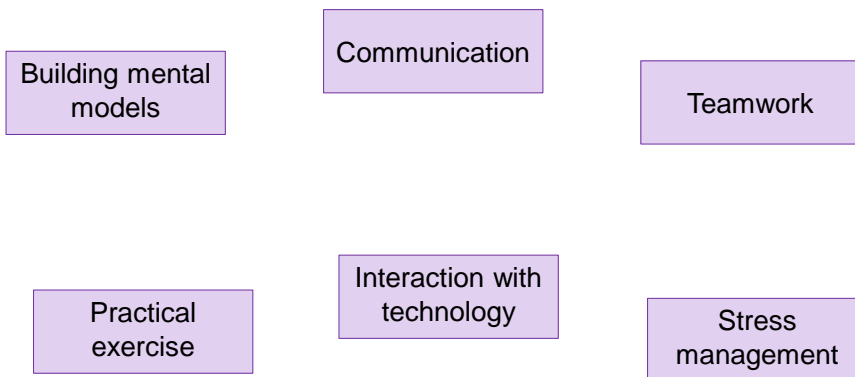




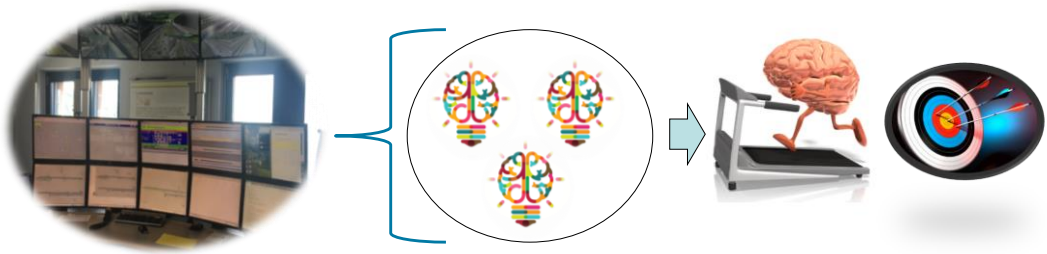
Training topics definition:



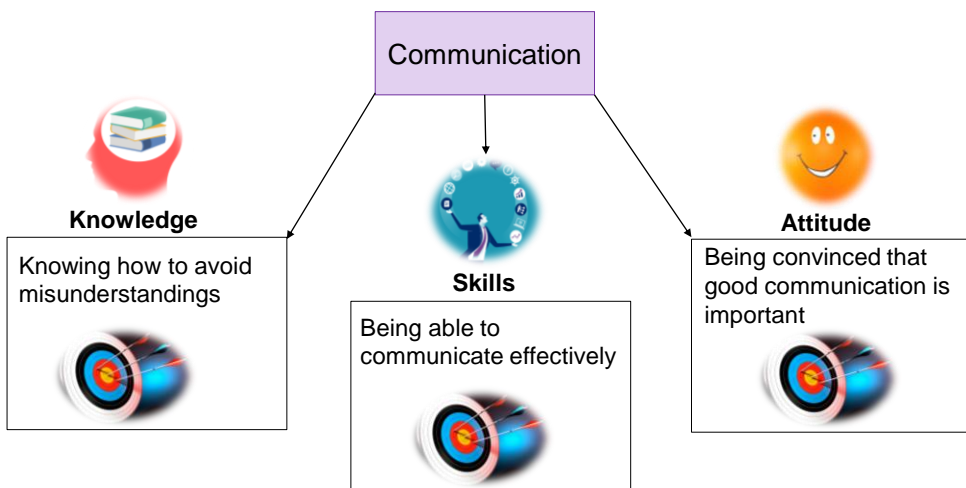
Training topics definition:



Qualitative design



Training goals formulation:





Training topics definition:

Building mental models

Communication

Teamwork

Practical exercise

Interaction with technology

Stress management

Implications

- Cognitive skills needed to
 - understand the job
 - master the most demanding tasks
 - adapt to varying conditions and appropriately react to unexpected events
- Training topics with specific goals



- Development of specific trainings
- Application in other highly automated domains

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Thank you very much for your attention!

