What requirements do future train drivers need to fulfill? A comparison of job profiles

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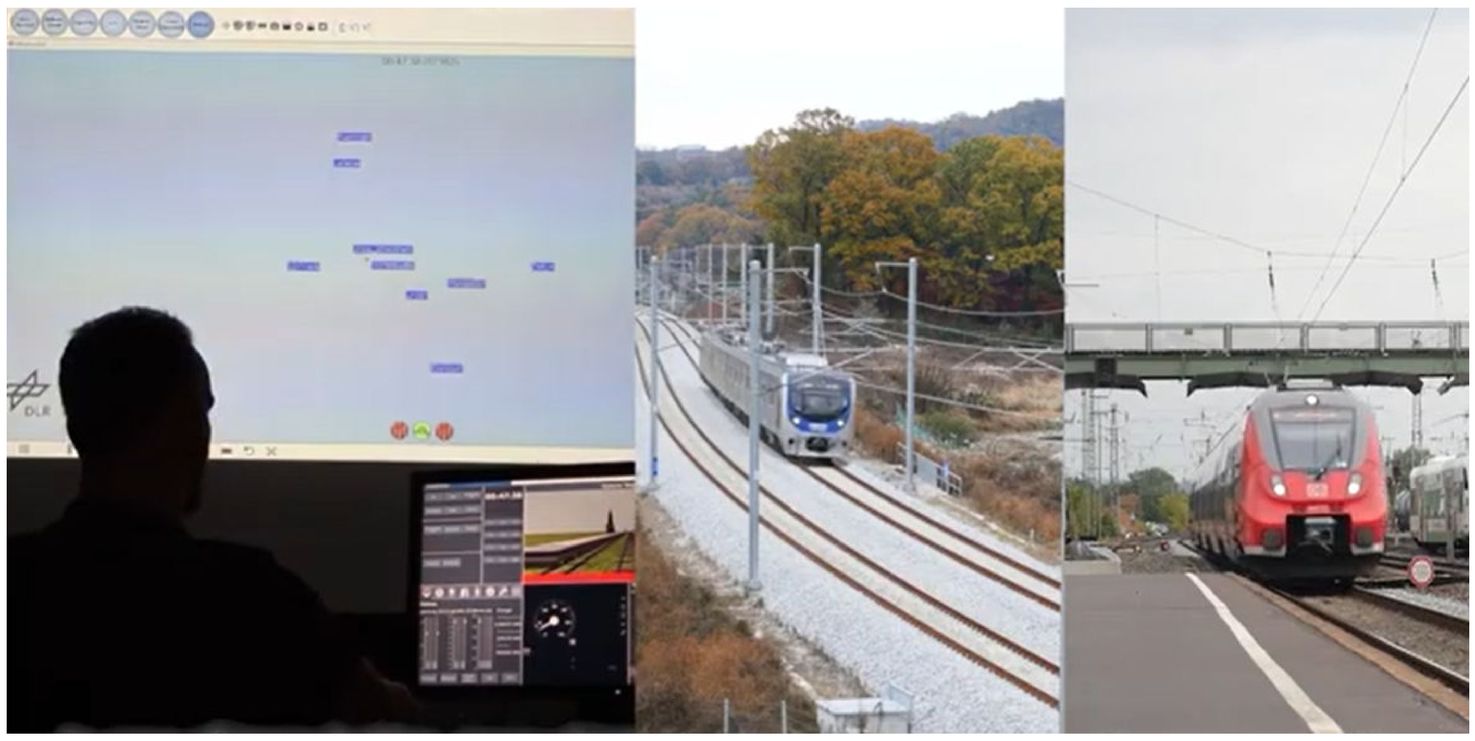

Fig. 1 Remote train operator monitoring a train from a control center. Source: DLR

Introduction

Technological changes enable higher automation in the transport sector. Thus, job environments for train drivers will change. Job holders will potentially operate trains from a control center, monitoring multiple trains simultaneously during routine operations. Additionally, they might remotely intervene in particular train rides if necessary. This study aims at comparing the requirements of future remote train operators (RTO) with actual train drivers (TD). Moreover the requirements were compared with requirements for future high-speed train drivers (HSTD), operating passenger trains with automated speed control on high-speed lines up to 400km/h, which had already been identified by use of the same method in an earlier study by Brandenburger et al. (2017).

Method

Samples:

Remote train operators (RTO)

- N=36 train drivers
- Age: M=40.3 yrs., Gender: m=36
- Experience: M=13.7 yrs. of service

Future high speed train drivers (HSTD)

- N=21 train drivers
- Age: M=42.6 yrs., Gender: f=3, m=18
- Experience: M=22.4 yrs. of service

Actual train drivers (TD)

- N=28 train drivers
- Age: M=38.6 yrs., Gender: f=1, m=27
- Experience: M=12.8 yrs. of service

Tasks for the subjects:

- Rate job requirements from the perspective of RTO, HSTD, and TD respectively
- Immerging into future job activities by a written job description (RTO & HSTD) and two videos describing future tasks (RTO)

Measures:

- F-JAS (Kleinmann et al., 2010) including 75 abilities belonging to five domains
- Abilities with a mean higher than 4 are categorized as “important” for the job

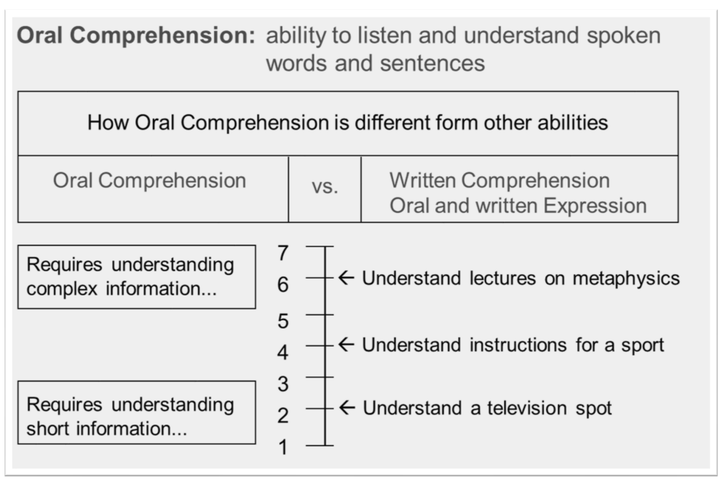

Fig. 2 Example Fleishman Job Analysis Survey (F-JAS)

Results

- Highest rated abilities for all job profiles in the domains of sensory/perceptual, cognitive and interactive/social abilities
- Psychomotor abilities were rated lower than sensory/perceptual, cognitive and interactive/social abilities, but still important
- Physical abilities were rated as unimportant for all three job profiles (with a mean lower than four). The lowest physical requirements were found for RTO.

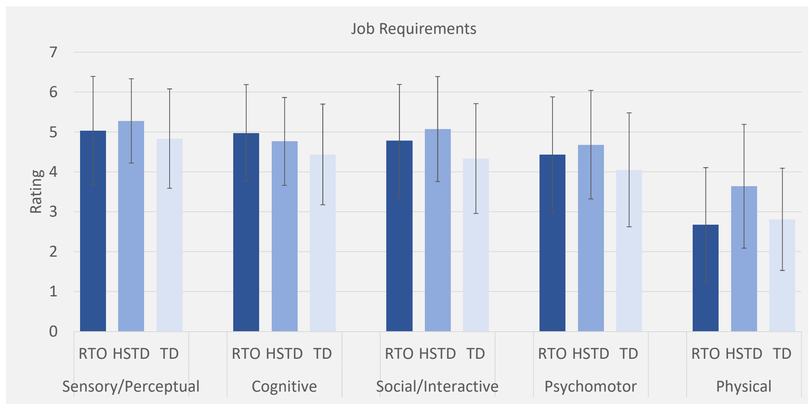

Fig. 3 Requirements aggregated to domains

- Comparing the three job profiles, the requirements seem to increase with higher automation (HSTD and RTO), except for physical abilities
- Cognitive abilities seemed to be highest for RTO, followed by HSTD and TD
- Top 10 requirements of RTO belong mostly to the cognitive and interactive/social domain
- The rankings for HSTD and TD are similar but show slight differences

Tab. 1 Top 10 requirements remote train operator

Requirements	Domain	Mean RTO	Mean HSTD	Mean TD
1. Dependability	S/I	6,47	6,43	6,46
2. Operational monitoring	Cogn.	6,31	5,73	5,39
3. Vigilance	Cogn.	6,08	--	5,54
4. Emotional control	S/I	5,94	5,76	5,71
4. Perseverance	S/I	5,94	5,86	5,85
6. Time sharing	Cogn.	5,86	5,33	5,46
7. Reaction time	Pm	5,72	5,57	5,36
8. Perceptual speed	Cogn.	5,64	5,43	5,25
9. Selective attention	Cogn.	5,61	5,48	5,67
9. Spatial orientation	Cogn.	5,61	4,90	4,96

Conclusion

Like actual train drivers, future train drivers and operators need to be dependable. Moreover, operational monitoring and vigilance become even more important.

Essentially, future job profiles for RTO and HSTD have the same requirements. Physical abilities are not important for all three job profiles.

References

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