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The Potential of Integrated Workload Measures in Production

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Abstract

Workplaces in production contexts are subject to various changes due to automation and robotics. Apart from the expected positive effects on the safety and health of workers, there is also evidence that prolonged supervisory control can lead to increased cognitive workload (e.g., sustained attention and error detection) as well as biomechanical stress (e.g., unfavorable body postures). We present methods for an objective measurement of cognitive/emotional and biomechanical load, such as eye or motion tracking as well as subjective measures. We discuss that for an integrative and comprehensive examination of workload, methods are needed that represent levels individually as well as the interaction of different measures. Exemplary results from laboratory studies indicate that individual prioritization processes lead to a negative impact either on posture and movement or on cognitive performance. We argue that this methodology is suitable for the implementation in the production context as the learnings can be used for the ergonomic improvement of workplaces, as well as for process optimization, for example in production planning. There is also a great need at the organizational level to generate objective data for measuring the social impact for social life cycle assessments. This could be another application for the suggested methodological approach.

Keywords
Workload Measurement, Cognitive Performance, Ergonomics, Biomechanical Load.

Biographies
Simone Kubowitsch is a Professor for Business Psychology at Augsburg Technical University of Applied Science. Prior to this position, she worked as a management consultant, e.g for the implementation and further development of process organization in industrial production. She earned her PhD at the University of Regensburg and the Labratory for Biomechanics at the OTH Regensburg about the influence of stress on muscle recruitment. She has completed research projects in psychophysiological measurements for pilot selection and training and stress measurement in autonomous driving. She studied Psychology at the University of Regensburg.

Peter Cocron is a Professor of Work Psychology at Augsburg Technical University of Applied Sciences. Prior to this position, he was Team Manager for Human Machine Interfaces and User Experience as well as for Infotainment Systems at Bertrandt AG in Gaimersheim, Germany. Before, he served as Post Doc and Group Leader at Chemnitz

University of Technology in Germany (2015 - 2017). In 2014, he completed his PhD at Chemnitz University of Technology in Germany. He studied Psychology at the University of Potsdam as well as at the University of Colorado at Boulder (USA) and earned a German Diploma in Psychology from the University of Regensburg. His research interests include Human Machine Interaction in traffic and at the workplace as well as User Experience.