Experimentaldesign in Studien mit Radfahrsimulatoren

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Abstract

The design of experiments with cycling simulators is complex and comprises many interlinked elements, the diversity and elaborate documentation of which make it difficult to compare studies.

In this bachelor thesis, the fundamental elements of experimental design in studies with cycling simulators are systematically analysed and presented in a structured manner. The aim is to identify core components such as research objectives, scenarios, variables, procedures, and analyses, and to evaluate their implementation. Based on 64 studies, it was found that although research questions were frequently formulated, hypotheses were often omitted, which restricts the scientific significance of the results.

Performance measures and subjective feedback were the most frequently used dependent variables, while psycho-physiological indicators and learning transfer were investigated less often. The scenarios were usually designed in physical detail, whereas psychological contexts were rarely considered. Furthermore, deficiencies were found in the documentation of demographic data and in the definition of independent variables.
The experiments were mostly well structured, but often lacked comprehensive analyses of interaction effects and systematic validity checks.

Overall, this thesis provides a valuable overview and orientation for future experiments with cycling simulators. It offers a helpful basis for researchers and developers to optimize simulation systems and improve future study designs.

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