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<p><b>Title of presentation</b></p> <p>Bar display or numeric display – which punctuality display makes more sense for train drivers?</p>	<p><b>Institution</b></p> <p>University of Applied Sciences and Arts Northwestern Switzerland</p>
<p><b>Please highlight workshop topic(s) your paper is relevant for</b></p> <p><input checked="" type="checkbox"/> Ergonomics and Usability of advisory and assistance systems</p> <p><input type="checkbox"/> Automation, Train control systems</p> <p><input type="checkbox"/> Fatigue, monotony, mental workload</p> <p><input type="checkbox"/> Risk, Human error and Human reliability</p> <p><input type="checkbox"/> Situation awareness</p> <p><input type="checkbox"/> Incident investigation</p> <p><input type="checkbox"/> Safety culture</p> <p><input type="checkbox"/> Human Factors Integration (e.g., in organizational processes)</p> <p><input type="checkbox"/> Rules and Standards</p> <p><input type="checkbox"/> others</p>	
<p><b>Abstract</b></p> <p><b>Background:</b> Drivers of some public transport, like trams or buses, are equipped with a punctuality display to continuously monitor the actual status with the scheduled times of the timetable. The train drivers of the Swiss Federal Railways and some other major railway companies in the country do not have such a punctuality display until now. Instead, they receive other information aids on the screen of their work tablets, such as frequent passage times for operating points or recommended speeds for a smooth and energy-saving journey. However, train drivers must compare two displayed times and perform a mental calculation to get their current earliness or delay in relation to the timetable.</p> <p><b>Aim:</b> The aim of this study was to investigate how a punctuality display needs to be designed to support drivers in a smooth and safe journey without causing stress or distraction.</p> <p><b>Method:</b> Two prototype punctuality displays, a bar graph display and a numeric display, were developed in a workshop with experts from the railway and occupational psychology fields. During the development the two prototypes were evaluated according to suitable design and usability criteria such as task appropriateness, conformity to expectations or individuality. In addition, the two prototypes were not allowed to restrict the train drivers' scope of action or distract them during the journey. The train drivers tested the two punctuality displays on test tablets during one to two work shifts. They then rated usefulness, distraction, stress, risk of confusion and other issues on an online-questionnaire using a 7-point Likert scale.</p> <p><b>Results:</b> Seventy-three train drivers tested the punctuality displays, 55 of whom completed the questionnaire. Eighty per cent of the drivers preferred the numerical display to the bar display. The ratings of some aspects, such as usefulness or interpretability, were significantly higher for the numeric display than for the bar display.</p> <p><b>Conclusion:</b> The results show a clear preference for the numeric display over the bar display. While the usability criteria in this study were only considered for the punctuality display itself, they should also be applied when the system is put in place.</p>	