ROADWAY SAFETY INSTITUTE

Advancing roadway safety with user-centered solutions

UTC Project Information	
Project Title	Computerized Crash Reports Usability and Design Investigation
University	University of Minnesota
Principal Investigator	Nichole Morris
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Funding Source(s) and Amounts Provided (by each agency or organization)	Minnesota Department of Transportation: $228,915
Total Project Cost	$228,915
Agency ID or Contract Number	UTC Grant Number: DTRT13-G-UTC35 MnDOT contract 99008 work order 140 CTS# 2014042
Start and End Dates	01/21/2014 – 08/31/2016
Brief Description of Research Project	*Final report abstract:* Electronic crash reports are advantageous because they can limit missing data, transcription errors, and the space limitations of a single sheet of paper. Advancing electronic reports through user-centered design affords an opportunity to improve law enforcement officer's (LEOs) ability to accurately, timely, and efficiently document crashes. Minnesota's commencement of a new crash records database offered a unique opportunity for a redesign of its electronic crash report to best support LEOs. A well-designed electronic report will not only support LEOs in the line of duty but will also lead to more useful, complete, and accurate data for various state and federal agencies for analysis and policy decision making. The objectives of this project were to: 1) improve crash data reliability and validity, 2) develop a framework crash report interface based on human factors principles and usability requirements, and 3) reduce the mental workload and required steps for users. Project tasks included: heuristic and hierarchical task analysis, cognitive walkthroughs, validity and reliability testing, interviews, beta testing, and usability testing. The human factors principles and user-centric approach lead the iterative design process to produce a product with high levels of usability and intuitiveness. The project featured a cooperative approach among university researchers, state agencies, and a private developer to ensure that the knowledge, design, and results of the research effort was fully transferred into the final product. The resulting interfaces preliminarily suggest improved user satisfaction, along with data completeness and accuracy, and provide a resource for replication in multiple domains.

Describe Implementation of Research Outcomes (or why not implemented) Place Any Photos Here	This project has led to two additional research projects with the Minnesota Department of Transportation (MnDOT). In the first, "Work Zone Intrusion Report Interface Design," Morris is helping MnDOT to develop a work zone intrusion reporting methodology and interface. In the second, "Minnesota Crash Records Audit," the research team is analyzing the data collected under the new electronic crash report and comparing it to previous data collected under the legacy report. This project will provide further evidence of the efficacy and value that the human factors analysis and redesign had not only on user satisfaction, but also on data quality, completeness, and reliability. The results of this project will be used to help Minnesota seek federal funds based on measurable gains in accuracy of crash data and will recommend multiple changes to the crash report interface, which are expected to be implemented. In 2019, representatives from state agencies in Louisiana and Colorado reached out to Dr. Morris asking for materials that might help them employ similar strategies in their states.
Impacts/Benefits of Implementation (actual, not anticipated)	In this project's second follow-up project, Morris and her team have demonstrated that the original "Computerized Crash Reports Usability and Design Investigation" improved the crash data that was captured using the new interface in 2016. The crash audit study has demonstrated that compared to 2015 under the old system, the 2016 MnCRASH data is more complete verifiable data and has fewer errors.
Web Links • Reports • Project website	• http://www.cts.umn.edu/Research/ProjectDetail.html?id=2014042 • http://www.cts.umn.edu/Publications/ResearchReports/reportdetail.html?id=2540