REPORT SUMMARY

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FTA RESEARCH
FEDERAL TRANSIT ADMINISTRATION

INTERACTIVE POWERPOINT TRAINING TO IMPROVE SAFETY DRIVER AWARENESS WHILE OPERATING A TRANSIT VEHICLE EQUIPPED WITH DRIVING AUTOMATION FEATURES

Background

As new vehicle technologies, such as advanced driver assistance systems (ADAS) and automated driving systems (ADS) are introduced into transit operations, the role of the operator is likely to change. In some cases, the operator may transition from active control of the vehicle to a monitoring role. For the potential safety and efficiency benefits of these advanced technologies to be realized, training may sometimes be required to help operators effectively assume this new role. This research effort, funded through the Federal Transit Administration (FTA) Strategic Transit Automation Research (STAR) Plan, seeks to determine whether a low-cost tool can be developed to maintain/improve safety and efficiency as transit agencies pilot test new technologies.

Objectives

There were two related objectives. First, the research team worked closely with a transit agency to identify three safety- and efficiency-related human factors that may cause concern when introducing an advanced technology to transit operations: hazard anticipation, hazard mitigation, and attention maintenance. With this in mind, error training, a proven method of improving driver skill, was used to develop an interactive training program. The program is interactive in the sense that it allows the user to make inputs on a PowerPoint slide, which can then be used to generate user specific feedback on the user's hazard anticipation, hazard mitigation, and attention maintenance skills in each of the four scenarios. The user iterates until mastery is obtained.

Second, the interactive training program was developed using commonly available software packages, Microsoft PowerPoint and Visual Basic. The choice of the two software packages was made to maximize the potential generalizability of this training to other transit agencies with training scenarios specific to their locales, as location-specific scenarios can be developed by anyone with a basic understanding of PowerPoint and can be administered on a laptop computer.

Findings and Conclusions

A total of 14 participants were enrolled in the pilot study, equally divided into experimental (interactive PowerPoint training) and control conditions (Placebo training). The experimental condition achieved a larger improvement after training than the control condition in every module and in every scenario. In every module, the largest gains in improvement after training were found in the experimental condition. The attention maintenance module achieved the largest improvement gains. A Mann-Whitney U-test confirmed that the distributions of the post-training scores for the experimental and control groups were different ($U = 0$; $p < 0.001$), while the pre-training scores were not, indicating that the hypothesis that the two distributions were identical can be rejected. A similar pattern was found when looking at the performance data averaged across

skills within each of the four scenarios. In every scenario, a larger gain in improvement was found for the experimental condition. No single scenario showed a noticeably larger or smaller effect, indicating that the effect of training was not dependent on a specific scenario.

Benefits

A significant part of the FTA research mission is to fund demonstrations of transit technologies, with the goal of improving system performance throughout the industry. These technologies, both in the demonstration phase, and later if broadly implemented, may require additional operator training. Both research objectives were achieved. First, a training program was developed that significantly improved hazard anticipation, hazard mitigation, and attention maintenance skills. Second, because widely available software programs were used, other transit agencies can easily include scenarios specific to their needs.

Finally, these results indicate that the overall effect was not specific to any particular module or scenario. This finding lends credence to the generalizability of this training across scenarios. Thus, it is hoped that the same training benefit across all three skills would occur for other transit agencies with different scenarios.

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Project Information

This research project was conducted by Dr. Scott Gabree of the John A. Volpe National Transportation Systems Center. For more information, contact FTA Project Manager Danyell Diggs at 202-366-1077 or danyell.diggs@dot.gov.

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