# A Computer-based interactive Multimedia Training CD-ROM for Novice Drivers in New Zealand

Robert B. Isler, Ph.D.
Psychology Department
The University of Waikato
New Zealand
r.isler@waikato.ac.nz

Craig Cockerton
Waikato Innovation Centre for electronic Education
The University of Waikato
New Zealand
craigc@waikato.ac.nz

**Abstract:** This paper will describe the psychological and educational rationales behind the development of a computer-based interactive multimedia training CD-ROM ('CD-DRIVES') that will be made available to all novice drivers in New Zealand at no cost to the individual. Novice drivers lack crucial higher level driving skills such as eye scanning, hazard detection and risk management. More than 70 live-action video allow these drivers to practice such skills from the safety of the own homes.

## Background

This paper will address a well-known and world-wide road safety problem: Young novice drivers are over-represented in fatal crash statistics. There is plenty of empirical evidence to suggest that such novice drivers are lacking higher level driving skills such as eye scanning, hazard detection and risk management.

New cutting-edge video technology and the advanced video capabilities of today's PCs, allow new approaches for delivering training in those critical areas. Novice drivers can now be exposed safely to footage of risky scenarios on computers and then be asked to respond to them as they would in real driving situations. Their latency to respond to hazards (up to 30% longer than experienced drivers) can then systematically be improved by using instant feedback and psychologically effective reward contingencies.

## Previous work and our approach

Our approach is building on the success of earlier PC based training programs developed by the AAA Foundation for Traffic Safety, USA (Blank & McCord, 1998) and Monash University Accident Research Centre, Australia (Regan, Deery, & Triggs, 1999). Recent research has shown that novice drivers who practiced PC based hazard detection and risk management skills, behaved differently than untrained drivers in simulated driving conditions and more importantly, in ways, that would decrease their exposure to risk (Fisher, D.L., Laurie, N.E., Glaser, R., Connerney, K., Pollatsek, A., & Duffy, S.A., 2002, p.287).

New and advanced digital technology allowed us to push for new frontiers. For example, our program 'CD-DRIVES' includes a substantial number of night driving scenarios, which we believe is an important feature, given the amount of night driving by teenagers. The live-action videos of the real traffic scenarios cover a large field of view and are of high resolution quality that allows the user to detect real and potential hazards as far as up to 200 meters away (see Cockerton and Isler, 2003, for detailed information on the technical aspects of the live-action videos). CD-DRIVES also includes an extensive instant reward and feedback system in order to keep the teenagers motivated as well as informed about their level of performance.

## Content

All simulations are provided with a fully functional 3D-dashboard and a near 360 degrees of vision around the virtual car through the inclusion of side and rear-view mirrors (see Figure below). The CD-DRIVES CD-ROM consists of five training modules: eye scanning, hazard detection, risk management, road commentary and the final challenge. All modules (except the road commentary module) consist of 18 trial of live-action video.

Figure: Video screenshot of CD-DRIVES

- The *eye scanning* module begins with information on the limitations of central and peripheral vision including some video footage comparing typical eye movement patterns of experienced drivers with patterns of inexperienced drivers, as captured by an ASL eye-tracker in a driving simulator of the University of Waikato. The 18 trials of live-action video require then the user to scan all views including the 3D-dashboard, rear and side view mirrors. For each trial, after they have seen a short driving scenario (about 5 seconds), the video stops and the user is required to respond to a multiple-choice question about a specific event they have just seen.
- The *hazard detection* module involves two variations of training. In the first 9 trials, each simulation stops after between 20 and 40 seconds and the user needs to click on all key hazards they can identify on the static image. In the second 9 trials, the user needs to click on the hazards while the video keeps playing.
- In the *risk management* module, the user is required to first identify a risky situation and then to take action before it is too late. That means they have to choose the correct time to act and what to do. For each of the 18 trials, the task for the user is to identify a risky situation as it develops and to take action before it is too late by clicking the mouse. Options of different possible responses are then given depending on the situation and the user needs to select the most appropriate response, i.e., they choose when to act and what to do.
- The *road commentary* module consists of 4 trials (about 20 seconds each) of driving simulation. There is one demonstration trial with an expert giving a road commentary so that the novice driver can learn how to perform the commentary correctly. For the next three simulations, the user gives their own commentaries first, followed by the expert commentaries.
- In the *final challenge* module, the user needs to integrate the previously learned skills. There are 6 trials of eye scanning, 6 trials of hazard detection, and 6 trials of risk management presented to the user in a random fashion.

**Development, distribution and evaluation**
The CD-DRIVES CD-ROM has been developed by the University of Waikato's Psychology Department and the Waikato Innovation Centre for electronic Education in co-operation with Wellington based new media studio Oktobor. The project has been funded by the Road Safety Trust and the Accident Compensation Corporation. CD-DRIVES takes part of the 'Practice' programme, a joint initiative between the Land Transport Safety Authority and the Accident Compensation Corporation, promoting the benefits of extensive supervised driving experience for young drivers. As part of this programme, all novice drivers (about 60,000 per year) can request a free 'Practice' package that includes the CD-DRIVES CD-ROM. In return, the recipients of CD-DRIVES will be asked to be contacted in the future for evaluation research purposes.

**References**

Blank, D., & McCord, R.(1998). Design and presentation of a CD-ROM driving program (Driving-ZED). *In Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting*, Santa Monica, CA. 1401-1402.

Cockerton, C. and Isler, R.B. (2003). Developing real-life driving simulations for novice driver education, ED-MEDIA 2003.

Regan, M.A., Deery, H.A., & Triggs, T.J.(1998). Training for attentional control in novice drivers. In *Proceedings of the Human Factors and Ergonomics Society 42nd Annual Meeting*. Santa Monica, CA. 1452-1456.

Fisher, D.L., Laurie, N.E., Glaser, R., Connerney, K., Pollatsek, A., & Duffy, S.A.(2002). Use of fixed-base driving simulator to evaluate the effects of experience and PC-based risk awareness training on drivers' decisions. *Human Factors, 44*, 2, 287-302.