



Research Studies on the Effectiveness of Simulation-Based Training

A substantial amount of in-depth white papers and research have been reported over the years to determine the effectiveness of using simulation-based training. Below are summarized excerpts from some of those in-depth studies.



<p>“Simulators can prepare drivers to handle unpredictable or safety-critical tasks that are inappropriate to practice on the road, such as collision avoidance or risky driving (Hoeschen et al., 2001)”</p> <p>“In these days of high-priced fuel, simulators provide a cost-effective solution to initial driver training. Besides financial benefits, simulators offer great opportunities for carrying out objective measurements on the user’s actions in a safe and purpose-developed virtual environment (Vlakveld, 2005b).”</p> <p>“Simulators provide complete control over training conditions. Behavior of other vehicles, weather conditions, or the virtual environment can be manipulated in real time according to training needs (Wassink et al., 2006).”</p> <p>“Virtual environments are purpose-developed as well, making it possible to practice many maneuvers in a short training session.”</p> <p>“A driving simulator can measure performance automatically, objectively, and accurately. Simulation data can be used for objective diagnosis of student performance, statistical analyses and predictions of future driving performance.”</p>	<p><i>Dr. Ir. Joost C. F. de Winter, Department of Bio Mechanical Engineering, Delft University of Technology, The Netherlands.</i></p>
<p>Study results indicate nearly a 10% reduction in officer collisions suggesting that completing some form of blended learning incorporating law enforcement driving simulators (LEDS) significantly reduce the chances of officer-involved collisions.</p> <p>“The largest reduction effect discovered for the blended approach (10% reduction) suggests that LEDS and EVOC training operate jointly to produce a combined reduction effect in collisions which is superior to that of each method when used alone.”</p>	<p><i>California Commission on Peace Officer Standards and Training, Driver Training Study Volume , 2009</i></p>
<p>“According to Brock et al (2011) reported that simulators are also able to replace some of the hours spend in the actual vehicle. This can have a significant impact on training costs, as simulator costs can run as low as \$3 per hour per student vs. \$40 per hour per student for in-vehicle training. “</p> <p>“Schneider National in Green Bay, Wisconsin implemented a technology-based training program for entry-level drivers. Schneider</p>	<p><i>Effectiveness of commercial motor vehicle driver training curricula and ...</i> <i>By John F. Brock, United States. Federal Motor Carrier Safety Administration. Brock, Jacob & McCauley 2001</i></p>



<p>reported that the graduation rates increased from 75% to 81%, average time to going on the job decreased by 38%, and 0-to-90 day accident rate decreased from 31% to 10%. Schneider also estimates that for each 1-day reduction in training time, it saved \$7,000,000 annually. “</p> <p>“Fifty- eight percent of the respondents indicated that simulator training is more effective than traditional training for teaching certain types of knowledge, skills, or attitudes.”</p> <p>“...the use of simulation reduced training time in one agency from 19 days to 17 days by replacing classroom bus training with simulator training. In another agency, using just the open-loop system, training time was reduced by 5 days when simulation was employed.”</p> <p>“In particular, simulator training validates defensive driving techniques taught in the classroom, provides an opportunity to experience hazardous situations without putting the students at risk, reinforces proper driving habits and defensive driving principles, and allows instructors to check reaction time, eye-hand coordination, and driving skills. “</p>	
<p>“Changing from classroom instruction to simulator-based training resulted in a 75% reduction in critical errors (not to mention a safer environment on the track for the drivers and instructors!).”</p> <p>“The reduction in critical errors can be attributed to the fact that the simulators presented much more hazardous conditions than could be recreated safely and reliable using real vehicles on the track.”</p> <p>“The objective measure for risk reduction could prove to be very significant in future evaluation of return on investment.”</p>	<p><i>Analysis of Simulator-based Training Effectiveness through Driver Performance Measurement. Darrell Turpin, Reginald Welles, Applied Simulation Technologies</i></p>



<p>“In one 18 month study, researched the effects of simulators on driver training performance. 92% of the training managers using the simulators expressed a ‘high level of satisfaction with their training simulator’.”</p> <p>“Trainers rated bus simulator training high in the areas of effectiveness in training first-time drivers and utility in the overall training curriculum. When asked if the simulator is more effective than traditional training for teaching certain types of knowledge, skills, or attitudes, 58 percent of respondents reported that the simulator is more effective than traditional training methods.”</p> <p>“All respondents believe that the simulator training provides an excellent opportunity to experience a hazardous situation without actually being in a hazardous situation.”</p> <p>“Although this study concentrated on driving simulators for transit bus operators, the study techniques and basic guidelines will apply to any driving simulator evaluation. By linking specific tasks and skills to simulator characteristics, training managers can acquire the simulation technology they need.”</p>	<p><i>Design of a Guidebook for the Acquisition and Use of Driving Simulators for Training Transit Bus Operators. John Brock, Cynthia Jacobs, Richard Buchter, Milestone Group.</i></p>
<p>The Texas Association of Counties had goals of using a simulator to reduce auto liability and workers’ compensation claims. After training 2,000 law enforcement, road and bridge truck drivers and other county drivers, they have reduced auto liability claims by 55%. Additionally, they reported an 18% reduction in occurrences for the 21-month period since using simulator-based training.”</p> <p>“Simulator based training is not the least expensive method of training and the initial cost is a concern, but as more drivers are trained the cost per participant becomes more in line with other forms of driver training. The unique aspect of simulator based training is that you can totally destroy a car in a collision, but with a click of the mouse you are back in business and no one is injured.”</p>	<p><i>Preliminary Results – Simulator Based Training to Reduce Costs. Texas Association of Counties, Paul Hoff. May 2002.</i></p>