

NDOT Research Report

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**The Effectiveness of Driver Education and
Information Programs in the State of Nevada**

June 2014

**Nevada Department of Transportation
1263 South Stewart Street
Carson City, NV 89712**



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**The Effectiveness of Driver Education and Information Programs
in the State of Nevada**

**Deliverable Report
Submitted to
Nevada Department of Transportation**

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EXECUTIVE SUMMARY

The objectives of this project were 1) to examine the quality of Nevada's driver education by evaluating the effectiveness of its programs and 2) to provide recommendations to improve driving education in Nevada based on the results from this study. Two different surveys were conducted in Clark County, Southern Nevada. The first survey focused on assessing the strengths and limitations of the current Driver Education Programs in Nevada by capturing the opinions and attitudes of those who went through the process as teenagers. The second survey focused on driver safety through the involvement of pedestrians on the road. These surveys and the corresponding statistical analysis as well as the existing literature have provided insights to improve driving education in Nevada. The corresponding recommendations were organized and provided into seven major categories: (i) lack of rigor of online driver education, (ii) interactive learning and technology, (iii) follow-up exams, (iv) practice/training at home, (v) collecting information about crashes, (vi) pedestrians, and (vii) additional emphasis. In particular, it is recommended to improve teaching and training in a number of ways. For example, considering the learning preference of the new generation of drivers, interactive web-based tools are recommended to complement the existing teaching methods in Nevada and the USA. The research team has begun developing various web-based interactive teaching modules to study and demonstrate the potential of this recommended method. Appendix C and D provide various design considerations and the corresponding screen shots for a prototype implementation. In addition, it is recommended to incorporate more pedestrian aspects into the driving education program curriculum. The existing driver education programs focuses more on the driver. By emphasizing that drivers and pedestrians share the road equally, this awareness may help reduce the number of car accidents and injuries in Nevada. Finally, due to the dangers of driving distractions (texting and calling on the cellphone) and impairments (driving while under the influence of alcohol or drugs), more emphasis on these topics in driver education – as well as more public announcements through billboards, television commercials, and magazines – can help to constantly remind drivers about having good driving habits. Even though it is important to address what they should not do while driving, they also need to understand what they face as a consequence of being distracted or impaired: being fined or going to jail. Training that includes seeing images of car crashes may prove helpful.

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INTRODUCTION

Objective

The purpose of this project was to examine the effectiveness of driver education and information programs in the State of Nevada. The results from this report were used to provide recommendations and suggestions for ways to enhance the current driver education system as well as driver safety.

The following objectives were addressed:

- Description of the current system for driver education and licensing in Nevada.
- Assessment of the importance of driver education programs in Nevada and in other states.
- Limitations about driver education in general.
- Data collection regarding current driver education in Nevada.
- Data collection regarding driver and pedestrian safety in Nevada.
- Development of mechanisms to educate and inform Nevada drivers and pedestrians about traffic safety.
- Development of simple yet innovative tools to train drivers about driver safety in Nevada.

The Current System

Obtaining driver education is required for any person between 15.5 and 17 years of age in Nevada. These teenagers must spend 30 hours in the program to receive a Certificate of Completion before obtaining a driver license. In addition, anyone above 18 years of age can take the driver education course, although it is not required. This driver education program can be completed in two ways: (1) on the internet or (2) at a professional driving or public school. This driver education program covers such topics as traffic laws, skills for driving, and the dangers of drinking and driving.

To receive the Certificate of Completion, people can find available and approved – i.e., DMV-licensed – driver education programs on the Nevada Department of Motor Vehicle (DMV) website (<http://www.dmvnv.com/dlschoolsprd.htm>). Each program has its own fee structure and the required 30 hours. Although the online courses do not provide behind-the-wheel training, some professional driving schools include it. Many high schools offer a driver education course to assist students in obtaining their certificate. However, typically, behind-the-wheel training is not included. As a substitute for the Certificate of Completion evidence by means of a report card or academic transcript is accepted for those who have taken the course during high school.

The Certificate of Completion is not required to receive an instruction permit. However, it is required to obtain the actual driver license. To receive the instruction permit – often referred to as the learner’s permit to practice driving – people must complete and pass vision and knowledge tests. Once an instruction permit is obtained, those under the age of 18 must complete 50 hours of behind-the-wheel training with 10 hours at night. If a teenage driver is unable to

participate in a DMV-approved driver education program for the Certificate of Completion, he/she still can satisfy that requirement by completing 100 hours of driver training. During the behind-the-wheel training, the trainee must be accompanied by a licensed driver who is at least 21 years of age with a minimum of one year of driving experience. Moreover, the trainees must keep a log of the dates and time of their training using form DLD-130, *DMV Beginning Driver Experience Log*. Teenage drivers must be 16 years of age and have held an instruction permit for at least six months to take the Driving Skills Test. The six-month requirement includes not having any at-fault accidents or violations related to speeding or drug/alcohol use.

After passing the Driving Skills Test and receiving a driver license, drivers under the age of 18 must abide by several restrictions, often referred to as the Graduate Driver Licensing System. During the first six months, they cannot transport passengers under 18 years old, except for immediate family members. In addition, they cannot drive between the hours of 10:00 PM and 5:00 AM – a curfew that they must comply with until they turn 18 years old. Lastly, parents or guardians who take full financial responsibility for the underage driver are allowed to cancel and take away their driver license at any time.

Driver Education Literature

In a recent report by the National Highway Traffic Safety Administration (2013), 33,561 motor vehicle fatalities occurred nationally in 2012, a 3.3% increase overall from the previous year; 2011 had 32,479 driving fatalities. In a similar analysis for 2012, the Insurance Institute for Highway Safety (2014) reported that teenagers were involved in 8% of the total number of motor vehicle fatalities: 2,823 teenage deaths out of 33,561 crash deaths. With these alarming statistics, it is clear the need to improve driver training. Young drivers between 16 and 19 years old are nearly three times more likely than people over 20 years of age to have fatal vehicle crashes (Insurance Institute for Highway Safety, 2014). Hence, driving education is an important step to help reduce such fatalities.

The purpose of the driver education program is to promote safety for inexperienced drivers, who are teenagers, primarily. This program is associated with the graduated driver licensing system, implemented in October 1, 2005 in Nevada (California State Automobile Association, 2007). The graduated driver licensing system adds more driving restrictions to teenage drivers under the age of 18. Ultimately, the goal is to prevent or reduce the number of young drivers from being involved in vehicle crashes or traffic fatalities.

Some studies have shown benefits associated with driving education. For instance, in California, fatal and severe injury crash rates were reduced for 16 and 17 year old drivers after the state implemented a stricter graduated driver licensing program in July of 1998 (Rice, Peek-Asa, & Kraus, 2004). As part of this program, teenage drivers are provided with a provisional driver license after six months of holding an instruction permit. With this provisional driver license, teenage drivers cannot drive at night (from midnight to 5:00 AM) unless they are accompanied by a licensed adult who is at least 25 years old or older. In addition, they are not allowed to carry passengers aged 19 or younger, except for family members, unless accompanied by a licensed adult. Any violation to these restrictions is penalized financially or with community service. After having a provisional driver license for a year, or upon turning 18 years old, teenage drivers can apply for an unrestricted driver license. This unrestricted driver license is

delayed if any violations have not been resolved, regardless of age. Similarly, other states have shown a decrease in the number of vehicle crashes for teenage drivers when implementing their own restricted driver program (Hyde et al., 2005; Vanlaar et al., 2009).

Although driver education programs provide some benefits making young drivers more aware about safe driving, improvements still are needed to enhance driver safety and reduce the chances of fatalities involving young drivers. With the availability and accessibility of driver education in the U.S., more teenagers are likely to get their driver license early; this trend could lead to more crashes (Robertson, 1980). Clinton and Lonero (2006) argued that having young and novice drivers go through a driving course does not necessarily reduce the risk of crashes; other factors must be considered when examining driver education. Mayhew (2007) suggested some aspects about driver education programs that could help promote greater safety for young adults:

- (1) Have more supervised driving practice by professional instructors and parents/guardians;
- (2) Have instructors work together with parents/guardians about the young driver's attitude about safe driving;
- (3) Extend the amount of time given to driver education beyond the 30-hour limit;
- (4) Emphasize certain skills in driving that typically are high risk factors for young drivers instead of just giving them a broad review of driving knowledge and skills; and
- (5) Implement other interactive teaching tools using technology, such as computer-based instructions and driving simulators.

Where Does Nevada Stand on Driver Safety?

According to the latest available driving report from the Nevada Department of Transportation (2010), Nevada ranks among the top 10 for the highest crash rates in the United States. In that year alone, 51,664 traffic crashes accounted for 32,754 property damages, 18,675 injuries, and 235 fatalities. Some of the factors contributing to these crash cases were failing to stay in the proper lane, speeding, drinking, falling asleep, and using drugs. With vehicle crashes being a significant and ongoing problem in the state, driver safety is an important issue. These crashes harm the people involved, and they affect the economy. In 2010, Nevada sustained a \$1.809 billion loss due to crashes.

In 2006, the Nevada Department of Transportation, the Nevada Department of Public Safety, and other safety agencies began an aggressive safety program, the Nevada Strategic Highway Safety Plan (Nevada Department of Transportation, 2011). This plan includes a *Zero Fatalities* campaign started in 2010 to promote safe driving and to eliminate or reduce the possible chance of losing more lives from car crashes. Their website (<http://www.zerofatalitiesnv.com/index.php>) addresses several topics including:

- (1) Buckle seat belts,
- (2) Drinking and driving,
- (3) Distracted driving,

- (4) Stop at red lights or stop signs, and
- (5) Pedestrian safety.

Each of these topics offers various statistics and facts to remind people about assigning priority to safety.

The *Zero Fatalities* campaign uses public service announcements on television to pursue the goal of safer driving and no fatalities in Nevada. Over the years, this program has been an influential way to help reduce traffic fatalities and injuries in Nevada. Although this program may not be the only contributing factor in creating safer drivers, reports have shown that between 2006 and 2012, traffic fatalities went from 431 to 258, about a 59.9% reduction (Nevada Department of Transportation, 2014). In addition, between 2006 and 2012, traffic injuries went from 2,011 to 1,099, about a 54.6% reduction (Nevada Department of Transportation, 2014).

Further actions are required to continue this downward trend for fatalities and injuries caused by drivers in Nevada. The ability to reduce the number of crashes in the state continues to remain a challenge. One important area that can contribute greatly in creating safer drivers would be the effectiveness of the driver education program. Although research has shown safety benefits for teenage drivers who take a driver education course and are restricted to certain driving rules through the graduated driver licensing system, the findings are limited in helping to understand whether these safe driving practices continue beyond their teenage years, such as for those who are now in college. Specifically, the question remains whether their good driving habits and skills that they learned in their early years of driving remained in adulthood. In fact, findings have shown that male and female drivers between the age group of 26 and 35 are prone to causing more vehicle crashes than the younger age groups in Nevada (Nevada Department of Transportation, 2010). Therefore, more research is needed to determine whether such programs as driver education courses and the graduated driver licensing system are effective in the long term.

PART I: A SURVEY ON THE EFFECTIVENESS OF DRIVER EDUCATION

A survey was designed and conducted to examine the effectiveness of Driver Education Programs in Nevada. Before this study, there was not long-term (once the restrictions for trainee drivers are no longer required) evaluation of the effectiveness of Drivers Education Programs in Nevada. Although studies about the Driver Education Programs and Graduated Driver Licensing Systems have shown benefits for teenage drivers who still are teenagers, the findings are limited only to that particular age group. More of a challenge is tracking those who are now in college, or beyond 18 years of age, on whether the safety habits and skills that they learned in driver training have been effective over time. This survey attempted to evaluate and provide insights about this issue. A copy of the survey is provided in Appendix A of this report.

Demographics

A total of 330 people participated in this survey, all living within Clark County in Southern Nevada. The sample was taken from a college population at the main campus of the University of Nevada, Las Vegas (UNLV). Of this group, 225 were Las Vegas residents, 62 were Henderson residents, 35 were North Las Vegas residents, seven were from Boulder City, and one was from Pahrump. The sample consisted of 108 males and 222 females, with an average age of 20.54 years ($SD = 4.309$ years). Of those who held a vehicle document in the sample, 35 were out-of-state licenses, 268 were Nevada driver licenses, and 27 were Nevada instruction permits.

Driver Education and Training

A total of 166 out of the 268 people received their licenses before the age of 18 in Nevada. They were asked several questions about going through the Driver Education Program.

Figure 1 provides the percentage of where they obtained their Certificate of Completion. The online course was the most popular for those who went through the Driver Education Program to obtain their Certificate of Completion ($n = 75$). The second largest group was those who went through their driver education at their high school ($n = 60$). The rest either took it at a professional driving school certified by the Nevada Department of Motor Vehicles ($n = 26$) or did not give a response to the question ($n = 5$).

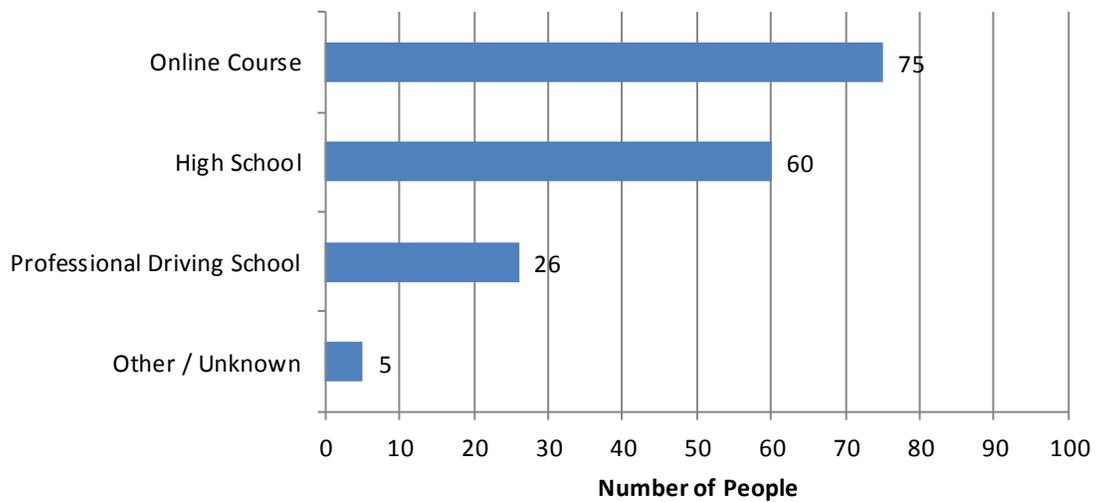


Figure 1 Where did you obtain your Certification of Completion?

As shown in Table 1, the numbers in parentheses correspond to the rating scale of ‘1’ being very ineffective and ‘5’ being very effective. On average, people responded to ‘teaching skills to drive in a vehicle’ as neither ineffective nor effective (M rating = 3, SD = 1.301). People rated as somewhat effective (M rating = 4.25, SD = 0.795) ‘teaching the traffic rules and laws’. Regarding ‘teaching how to deal with hazardous conditions’, they rated that as neither ineffective nor effective (M rating = 3.47, SD = 1.095). For ‘teaching how to purchase a vehicle’, they gave an average rating of somewhat ineffective (M rating = 1.59, SD = 1.029). Lastly, for ‘teaching the process of obtaining a driver license’, the rating was neither ineffective nor effective (M rating = 3.4, SD = 1.258).

Table 1 Please rate the effectiveness (how much you learned) about the following topics through your Driver Education Program on a scale of ‘1’ (Very Ineffective) to ‘5’ (Very Effective).

Ratings	Teaching you the skills to drive in a vehicle		Teaching you the traffic rules and laws		Teaching you how to deal with hazardous conditions		Teaching you how to purchase a vehicle		Teaching you the process of obtaining a driver license	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Very Ineffective (1)	27	16.27%	1	0.60%	10	6.02%	101	60.84%	16	9.64%
Somewhat Ineffective (2)	31	18.67%	5	3.01%	20	12.05%	30	18.07%	24	14.46%
Neither Ineffective nor Effective (3)	34	20.48%	14	8.43%	40	24.10%	11	6.63%	33	19.88%
Somewhat Effective (4)	45	27.11%	72	43.37%	64	38.55%	5	3.01%	52	31.33%
Very Effective (5)	20	12.05%	67	40.36%	25	15.06%	6	3.61%	34	20.48%
No Response (6)	9	5.42%	7	4.22%	7	4.22%	13	7.83%	7	4.22%
Total <i>N</i>	166		166		166		166		166	
Mean Rating Response	3		4.25		3.47		1.59		3.4	
<i>SD</i>	1.301		0.795		1.095		1.029		1.258	

n = number of responses; *N* = total responses; *SD* = standard deviation

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In Table 2, the numbers in parentheses correspond to a rating between ‘1’ (Not Covered At All) and ‘5’ (Covered Extremely Well). The topics that were covered extremely to fairly well were about the traffic rules and laws (M rating = 4.16, SD = 0.958) as well as about being a considerate and safe driver (M rating = 3.61, SD = 1.141). The topics that were covered moderately to slightly well were:

- Knowing how to deal with risky conditions (M rating = 3.49, SD = 1.152),
- Avoiding and dealing with distractions while driving (M rating = 3.43, SD = 1.270),
- Controlling negative emotions while driving (M rating = 2.82, SD = 1.297), and
- Planning a driving route ahead of time (M rating = 2.51, SD = 1.339).

Table 2 Please rate how well each of the following topics were covered in your training on a scale from 1 (Not Covered At All) to 5 (Covered Extremely Well).

Ratings	Respecting the traffic rules and laws (e.g., not speeding, not texting, etc.)		Controlling negative emotions (e.g., anger) while driving		Knowing how to deal with risky driving conditions (e.g., severe weather conditions)	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Not Covered At All (1)	3	1.81%	33	19.88%	11	6.63%
Covered Slightly (2)	9	5.42%	31	18.67%	20	12.05%
Moderately Covered (3)	17	10.24%	47	28.31%	40	24.10%
Covered Fairly Well (4)	61	36.75%	28	16.87%	56	33.73%
Covered Extremely Well (5)	69	41.57%	20	12.05%	32	19.28%
No Response (6)	7	4.22%	7	4.22%	7	4.22%
Total <i>N</i>	166		166		166	
Mean Rating Response	4.16		2.82		3.49	
<i>SD</i>	0.958		1.297		1.152	

n = number of responses; *N* = total responses; *SD* = standard deviation

Ratings	Being a considerate and safe driver		Planning driving route ahead of time (i.e., considering time of day, best route, etc.)		Avoiding and dealing with distractions while driving	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
Not Covered At All (1)	4	2.41%	46	27.71%	16	9.64%
Covered Slightly (2)	29	17.47%	42	25.30%	25	15.06%
Moderately Covered (3)	35	21.08%	31	18.67%	28	16.87%
Covered Fairly Well (4)	48	28.92%	21	12.65%	55	33.13%
Covered Extremely Well (5)	43	25.90%	18	10.84%	35	21.08%
No Response (6)	7	4.22%	8	4.82%	7	4.22%
Total <i>N</i>	166		166		166	
Mean Rating Response	3.61		2.51		3.43	
<i>SD</i>	1.141		1.339		1.27	

n = number of responses; *N* = total responses; *SD* = standard deviation

As shown in Table 3, the four highly selected types of distraction that driver education programs taught the students well were driving under the influence (87.95%), dealing with weather (86.14%), texting on their cell phone (85.54%), and handling passengers in a vehicle (85.54%). The four types of distraction taught least were grooming and doing make-up (50.00%), eating (54.22%), dealing with environmental factors (e.g., billboard ads and construction zones; 63.25%), and driving under the influence of other drugs besides alcohol (81.93%).

Table 3 During your driver training, were you made aware of the following distractions that can affect your driving? Select all that apply.

Type of Distraction	Number of Responses	% of Sample (Out of 166 People)
Texting on Cell Phone	142	85.54%
Talking on Cell Phone	141	84.94%
Passengers (e.g., friends, children, pets)	142	85.54%
Weather	143	86.14%
Environmental Factors (e.g., billboard ads, construction zones)	105	63.25%
Grooming (e.g., shaving) / Make-Up	83	50.00%
Driving Under the Influence of Alcohol	146	87.95%
Driving Under the Influence of Drugs	136	81.93%
Eating	90	54.22%
Other	3	1.81%
No Response	4	2.41%

Figure 2 shows that about 82.5% of those who took part in the Nevada Driver Education Program reported that their motivation to have safe driving habits and behaviors were moderately important ($n = 17$), an important influence ($n = 70$), or a top priority ($n = 50$). This finding demonstrated that taking a course in driver education could increase their motivation level for safety.

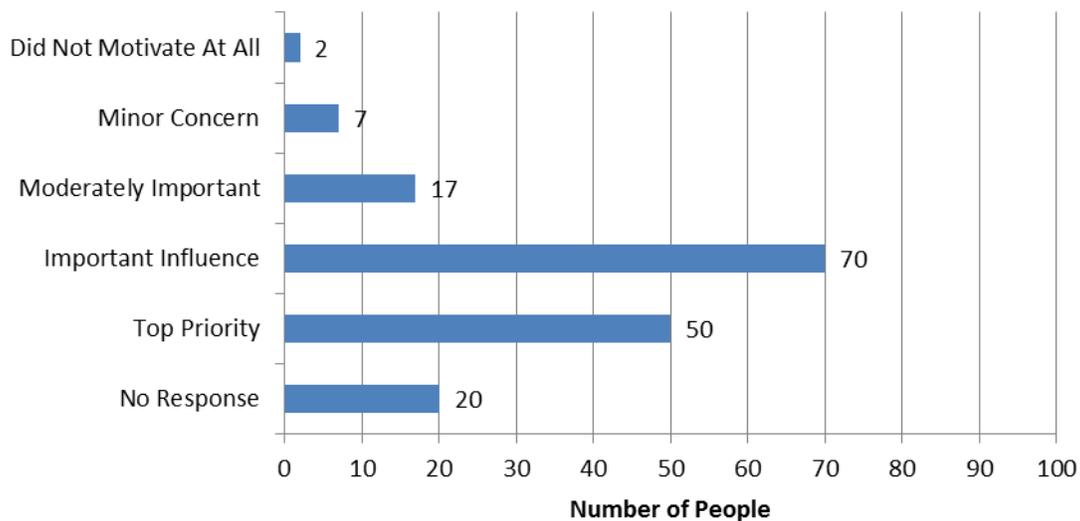


Figure 2 Immediately after completing your Driver Education Program, how much did safety motivate your driving habits and behaviors?

According to Figure 3, although taking an online course was more popular in the survey in terms of what people actually chose for driver education, about 52.40% (87 out of 166 people) of the sample preferred to retake their driver training in person. In other words, while people took driver education online, they acknowledged that maybe they should have taken it in person.

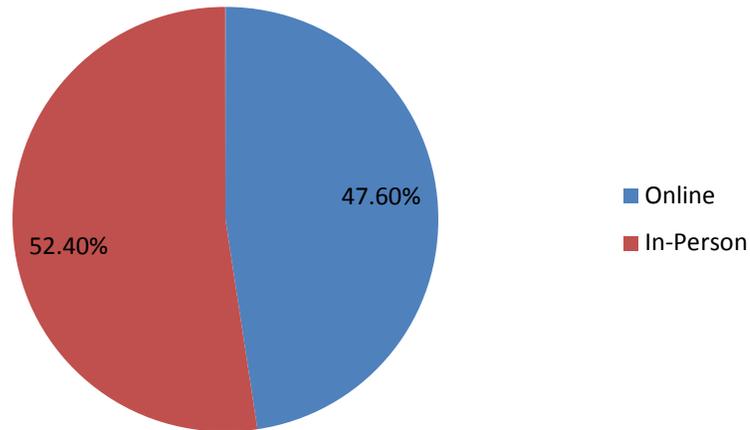


Figure 3 If you had to take a driver education training again, would you prefer an online or in-person class?

About 71.1% (118 out of 166 people) rated their driver education training as either somewhat easy ($n = 24$), easy ($n = 34$), or very easy ($n = 60$), as shown in Figure 4. The ratings are very informative in that they indicate that the Driver Education Programs in Nevada are not as rigorous or challenging as needed. This is a potentially serious concern because better learning typically is associated with higher levels of effort (Craik, 2002; Craik and Lockhart, 1972).

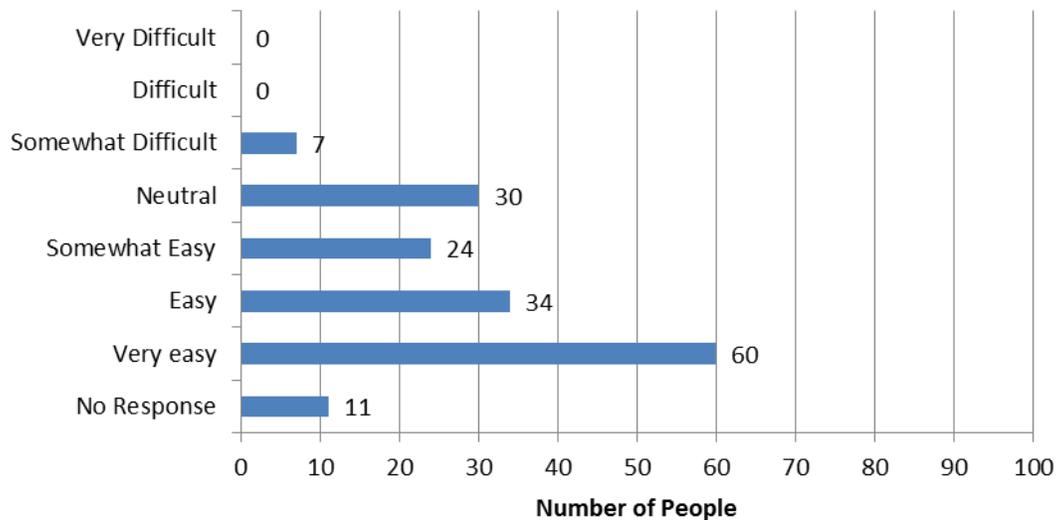


Figure 4 How would you rate the difficulty of your training?

Regarding their ability to learn to drive, 51.8% (86 out of 166 people) rated ‘somewhat satisfied’ ($n = 31$), ‘satisfied’ ($n = 38$), or ‘very satisfied’ ($n = 17$). Out of 166 people, 35 (21.1%) had a neutral stance regarding their satisfaction; 15.7% (26 out of 166 people) were ‘somewhat dissatisfied’ ($n = 17$), ‘dissatisfied’ ($n = 5$), or ‘very dissatisfied’ ($n = 4$); and 11.4% (19 out of 166 people) gave no response to this question. This is summarized in Figure 5.

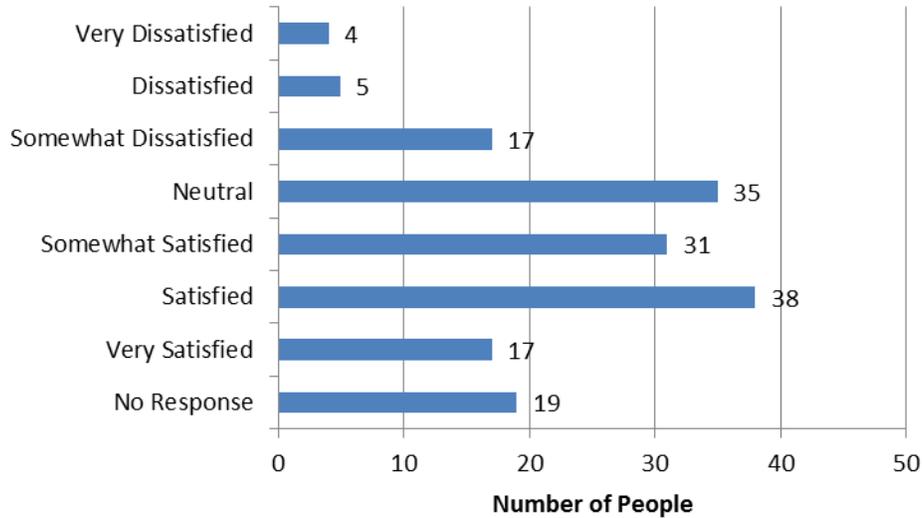


Figure 5 How satisfied were you with learning how to drive?

According to Figure 6, about half of the people in the sample (94 out of 166 people; 56.6%) responded by saying that they would probably ($n = 55$) or definitely ($n = 39$) practice their driving through a simulator. Out of 166 people, 32 (19%) did not know whether they would be interested in the driving simulator, and 24.1% (40 out of 166 people) responded that they probably or definitely would not be interested in using the driving simulator.

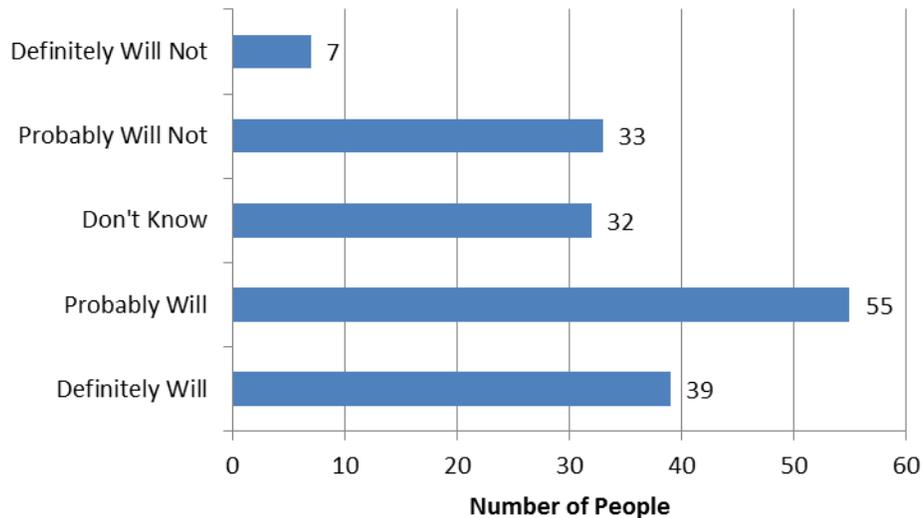


Figure 6 If you could practice using a driving simulator (i.e., a virtual reality driving machine), would you use it for the behind-the-wheel experience?

As shown in Table 4, the top four selected changes that people thought would improve the quality of driver education were using a driving simulator to practice driving (53.01%), improving the teaching methods in the classes (46.39%), and requiring an exit exam to graduate from the program (37.35%). Tied for fourth was extending the number of required driving hours with an instructor (36.14%) and taking an annual driving exam for X number of years after earning their license (36.14%). The three least selected changes were extending the required hours of

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classes/instruction one should take (19.28%), including follow-up classes after students earn their license (26.51%), and extending the required driving hours (29.52%).

Table 4 What changes would you make to create better drivers? Please think about this in terms of what would improve driving quality, not how enjoyable it would be for the student. Select all that apply.

Changes	Number of Responses	% of Sample (Out of 166 People)
Requiring an exit exam to graduate from the program	62	37.35%
Extending the required hours of classes / instruction one should take	32	19.28%
Extending the number of required driving hours (in general)	49	29.52%
Extending the number of required driving hours with an instructor	60	36.14%
Using a driving simulator to practice driving	88	53.01%
Including follow-up classes after students earn their license	44	26.51%
Taking an annual driving exam for X number of years after earning the license	60	36.14%
Improving the teaching methods in the classes	77	46.39%
No Response	17	10.24%

Driver Experience

For the following analyses, 268 people with Nevada driver licenses were included. The general focus was to examine some of their driving habits and skills.

Predictors of Vehicle Accidents

A multiple regression analysis was conducted to determine whether the following variables were associated with the likelihood of vehicle accidents:

- The number of years a person has had experience driving (Driver Experience),
- Current age (Age),
- The number of close calls or near accidents (Close Calls),
- The number of times being pulled over (Pulled Over),
- The number of police warnings (Warnings), and
- The number of times a person has received a police ticket (Ticket).

One of the participants was excluded from the analysis because his/her response was incomplete. For this multiple regression model, 267 responses were analyzed. Descriptions of the predictor and outcome variables are shown in Table 5.

Table 5 Description of Variables

Predictor Variables	<i>M</i>	<i>SD</i>	Minimum	Maximum
Driver Experience	3.03 years	3.744 years	0 years	29 years
Age	20.69 years	4.419 years	17 years	45 years
Close Calls	3.61	5.851	0	50
Pulled Over	1.25	2.269	0	20
Warnings	0.6	1.42	0	14
Tickets	0.65	1.399	0	14
Outcome Variable	<i>M</i>	<i>SD</i>	Minimum	Maximum
Accidents	0.51	0.833	0	5

M = Mean *SD* = Standard Deviation

The findings indicated a significant multiple regression, $F(6, 260) = 7.510, p < .001$, when entering the explanatory variables to estimate the outcome variable (Accidents). Based on the *R*-squared value, only 14.8% of the variability of the predictors could account for the likelihood of drivers getting into accidents.

The results of each predictor are shown as follows. Interpretation of each predictor variable is true only if the other predictors are held constant. The *B* represents unstandardized beta coefficients, reflecting on the directionality of the predictive relationships.

Driver Experience

When a person has fewer years of driving experience, they are likely to get into more vehicle accidents ($B = -.065$), $t(266) = -2.847, p < .01$.

Age

As age increases, the number of vehicle accidents also increases ($B = .058$), $t(266) = 2.926, p < .01$. Although it may seem odd that age and driver experience do not show a similar prediction, the sample consisted of those who may have received their Nevada driver license at an older age, hence, giving them less overall experience.

Close Calls

The number of close calls or near accidents did not significantly contribute to the model for predicting the number of vehicle accidents, $t(266), .348, p = .728$.

Pulled Over

As people get pulled over in greater numbers by the police, there is an increased likelihood that they also would get into vehicle accidents ($B = .177$), $t(266) = 3.702, p < .001$. Being pulled over may be a sign of people's aggressive driving behavior, which may contribute to vehicle accidents.

Warnings

There was no significance in predicting the number of vehicle accidents with the number of police warnings, $t(266) = -1.784, p > .05$.

Tickets

The number of police tickets did not significantly predict the likelihood of getting into accidents, $t(266) = -.970, p = .333$.

The regression model shown in Table 6 indicates that driver experience, age, and being pulled over all were predictive of vehicle accidents. However, due to a limited sample, these findings may only be predictive to those in this survey. As noted earlier, only 14.8% of the variance could be accounted for between the predictor variables and the number of vehicle accidents. Even so, it may be possible that the number of close calls, police warnings, and police tickets can affect people’s behavior regarding getting into vehicle accidents. Further research is needed by increasing the sample size in order to determine whether the predictors are likely to influence vehicle accidents.

Table 6 Multiple Regression

Predictors	<i>B</i>	<i>SE B</i>
Constant	-0.63	0.352
Driver Experience*	-0.065	0.023
Age*	0.058	0.02
Close Calls	0.003	0.009
Pulled Over*	0.177	0.048
Warnings	-0.092	0.052
Tickets	-0.06	0.062

R-squared = 14.8% *B* = Unstandardized Beta Coefficients

* = $p < .05$ *SE B* = Standard Error

Other analyses were conducted based on survey questions about their driving habits and experiences. The questions were as follows.

According to Table 7, the three top violations committed were driving over the speed limit (81.34%), talking on the cell phone while driving (55.60%), and texting while driving (51.49%). The three violations committed the least were blocking a roadway (6.72%), passing a school bus when its red lights are flashing (8.96%), and having an expired registration (11.57%).

Table 7 Have you ever committed any of the following violations while driving even if you did not get a ticket or warning for it? Select all that apply.

Type of Violation	Number of Responses	% of Sample (Out of 268 People)
Driving over the speed limit	218	81.34%
Driving below the speed limit	102	38.06%
Blocking a roadway	18	6.72%
Driving under the influence (e.g., drinking or using other drugs)	38	14.18%
Expired registration	31	11.57%
Texting on your cell phone	138	51.49%
Talking on your cell phone	149	55.60%
Passing a school bus when its red lights are flashing	24	8.96%
Driving through the carpool lane without any passengers	27	10.07%
Other	17	6.34%
No Response	35	13.06%

As shown in Figure 7, 75% (201 out of 268 people) use their cell phones without a headset while driving (which is illegal). The other 25% (67 out of 268 people) never use their cell phones without a headset while driving.

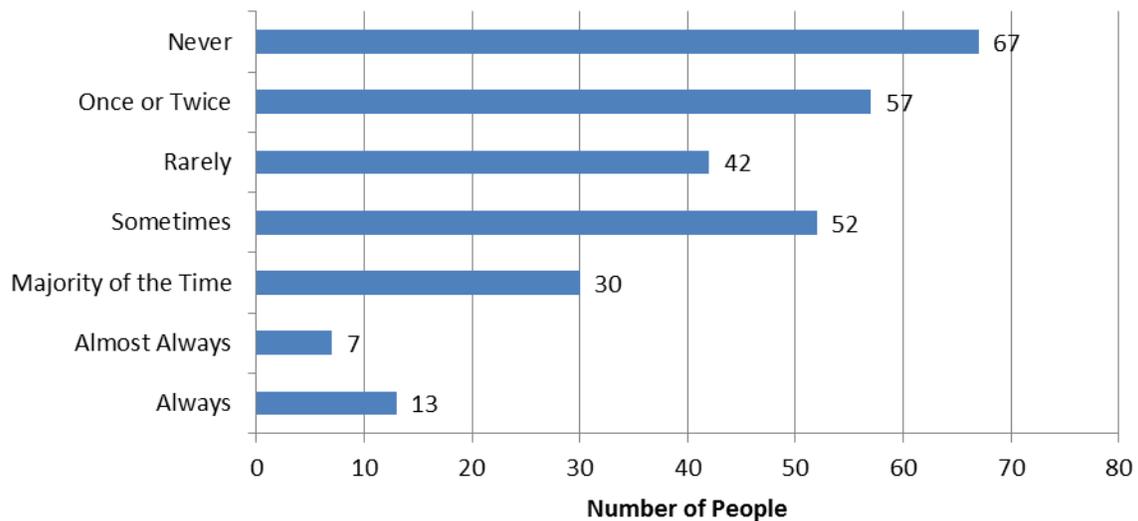


Figure 7 How frequently do you use your cell phone WITHOUT a headset while driving?

According to Figure 8, although 19% (51 out of 268 people) stated that they never texted on their cell phones while driving, a significant number of respondents (81%; 217 out of 268 people) stated that they texted while driving (which is illegal).

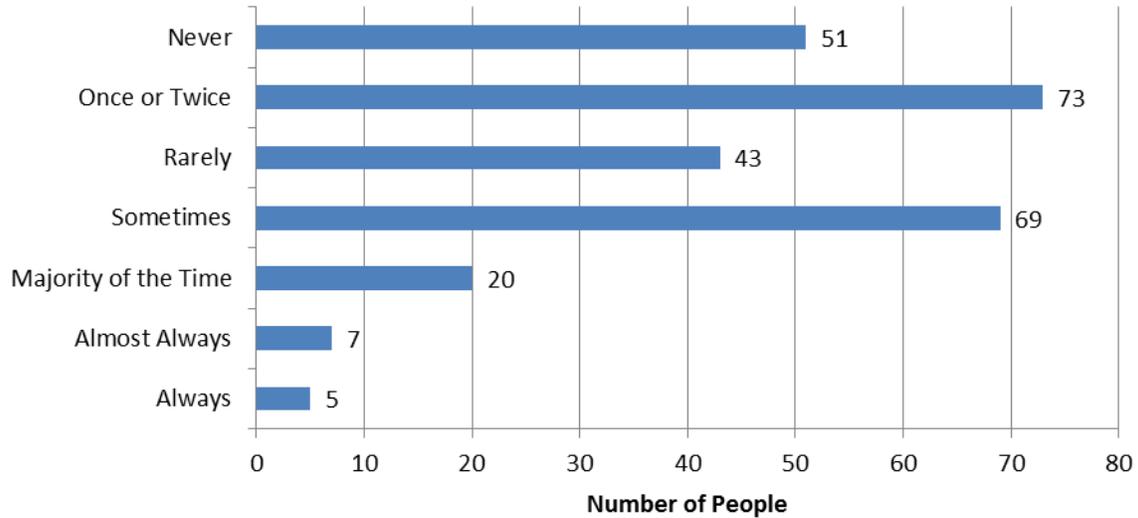


Figure 8 How frequently do you text on your cell phone while driving?

As shown in Table 8, when asked to select all of the ways that they text in their vehicles, 78.36% (210 out of 268 people) stated that they text when they stop at a traffic stop and 8.96% (24 out of 268 people) pull over and text. However, 18.28% (49 out of 268) admitted to texting while driving the vehicle.

Table 8 If you text on your cell phone while driving, when do you do the texting? Select all that apply.

When do you text?	Number of Responses	% of Sample (Out of 268 People)
I text while I am driving the vehicle.	49	18.28%
I pull over and text.	24	8.96%
I text when I stop my vehicle during a traffic stop.	210	78.36%
Other	3	1.12%
No response	46	17.16%

Out of the 268 people in this sample, 22.80% (61 out of 268 people) have driven under the influence of alcohol and 77.20% (207 out of 268 people) have not, as shown in Figure 9. While 22% still is too high of a percentage, it should be noted that these values are much lower than the percentages of people who reported texting or using a cellphone without a headset. The high cell phone and texting numbers are especially alarming because psychological research has shown comparable negative effects for both cell phones as well as intoxication on driving (Strayer et al., 2006).

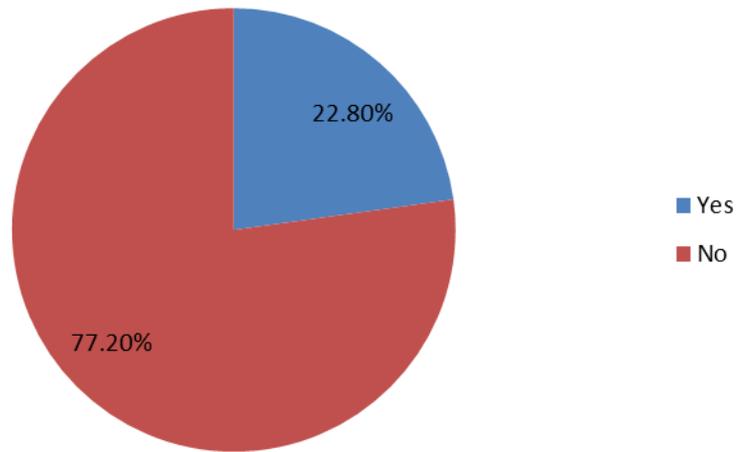


Figure 9 Have you ever driven under the influence of alcohol?

As shown in Figure 10, out of 268 people in the sample, 14.20% (38 out of 268 people) have driven under influence of other drugs, such as prescription or recreational drugs; 85.80% (230 out of 268 people) have never done drugs while driving.

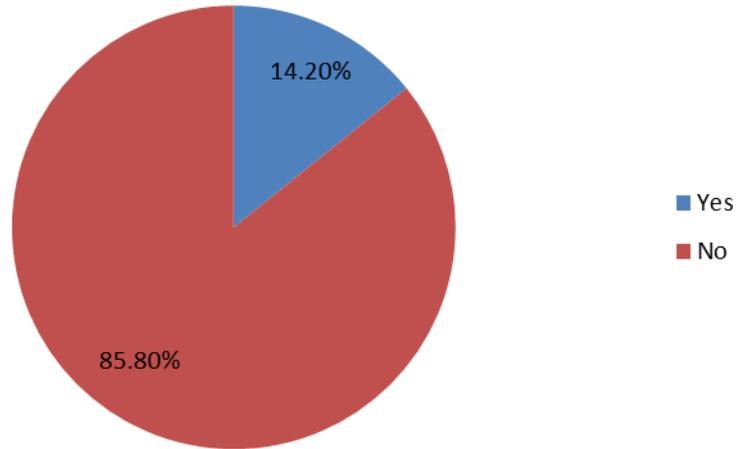


Figure 10 Have you ever driven under the influence of other drugs (e.g., prescribed or recreational drugs)?

As shown in Figure 11, out of the 268 people in the sample, 64.60% (173 out of 268 people) have driven while close to falling asleep and 35.40% (95 out of 268 people) stated they have not driven while close to falling asleep.

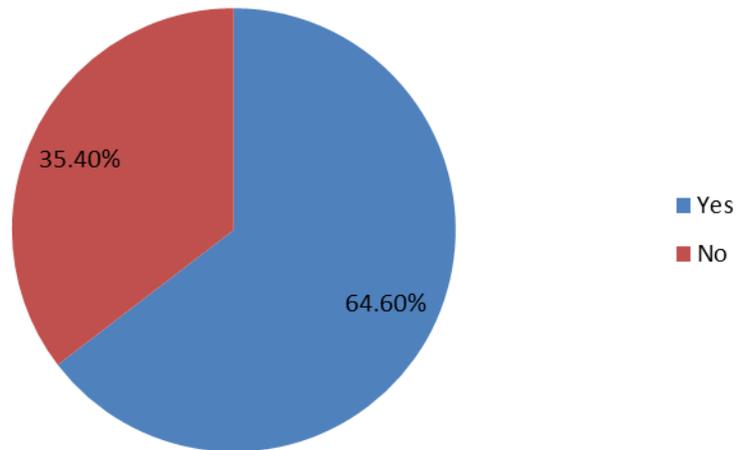


Figure 11 Have you ever driven while being close to falling asleep?

Driver Knowledge

In Table 9, the numbers in parentheses correspond to the scale rating the respondents' confidence. The ratings ranged from '1' (extremely confident that there is no law) to '7' (extremely confident that there is a law). When asked how confident they were about the laws in Nevada, on average, people were confident to extremely confident that there were laws against the following:

- Using hand-held phones while driving (M rating = 6.58, SD = 1.111),
- Driving under the influence of alcohol (M rating = 6.83, SD = .900),
- Driving under the influence of prescription drugs (M rating = 5.60, SD = 1.736), and
- Driving under the influence of recreational drugs (M rating = 6.71, SD = .989).

In addition, on average, they were confident that there was no law regarding using hands-free cell phones while driving (M rating = 2.51, SD = 1.712).

Table 9 Confidence Levels Regarding Driving Laws in Nevada

Is there a law in Nevada that...	... bans the use of hand-held cell phones while driving?		... bans the use of hands-free cell phones while driving?		... prohibits driving under the influence of alcohol?		... prohibits driving under the influence of prescription drugs (e.g., painkillers, allergy medications, sleep aids, etc.)?		... prohibits driving under the influence of illegal drugs (e.g., marijuana, heroin, etc.)?	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
(1) Extremely confident that there is no law	5	1.87%	103	38.43%	5	1.87%	7	2.61%	4	1.49%
(2) Confident that there is no law	2	0.75%	64	23.88%	1	0.37%	15	5.60%	1	0.37%
(3) Somewhat confident that there is no law	2	0.75%	31	11.57%	0	0.00%	16	5.97%	1	0.37%
(4) Unsure	6	2.24%	38	14.18%	1	0.37%	31	11.57%	7	2.61%
(5) Somewhat confident that there is a law	7	2.61%	9	3.36%	1	0.37%	34	12.69%	6	2.24%
(6) Confident there is a law	33	12.31%	10	3.73%	6	2.24%	34	12.69%	12	4.48%
(7) Extremely confident that there is a law	213	79.48%	13	4.85%	254	94.78%	131	48.88%	237	88.43%
Total <i>N</i>	268		268		268		268		268	
Mean Rating Response	6.58		2.51		6.83		5.6		6.71	
<i>SD</i>	1.111		1.712		0.9		1.736		0.989	

n = number of responses; *N* = total responses; *SD* = standard deviation

Familiarity with the Driving Laws

In Table 10, the numbers in parentheses correspond to the familiarity scale of '1' (Not at All Familiar) to '5' (Extremely Familiar). On average, people were moderately to very familiar with:

- The laws of texting and talking on a hand-held cell phone while driving (M rating = 3.30, SD = 1.135),
- Stopping when a school bus displays its flashing red lights and stop sign (M rating = 3.91, SD = .988), and
- Stopping for a pedestrian at a crossing even when there is no stop light or stop sign present (M rating = 3.79, SD = 1.052).

Table 10 Familiarity with Driving Laws in Nevada

How familiar are you with the law about...	... texting and talking on a hand-held cell phone while driving?		... stopping when a school bus displays its flashing red lights and stop sign while students are boarding the vehicle?		... stopping for a pedestrian at a crossing even when there is no stop light or stop sign present?	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
(1) Not at All Familiar	17	6.34%	1	0.37%	4	1.49%
(2) Somewhat Familiar	42	15.67%	21	7.84%	27	10.07%
(3) Moderately Familiar	104	38.81%	75	27.99%	76	28.36%
(4) Very Familiar	54	20.15%	76	28.36%	74	27.61%
(5) Extremely Familiar	51	19.03%	95	35.45%	87	32.46%
Total <i>N</i>	268		268		268	
Mean Rating Response	3.3		3.91		3.79	
<i>SD</i>	1.135		0.988		1.052	

n = number of responses; *N* = total responses; *SD* = standard deviation

PART II: A SURVEY ON DRIVER AND PEDESTRIAN SAFETY

The National Highway Traffic Safety Administration (2013) reported that between 2011 and 2012, the number of pedestrian fatalities and injuries in the United States significantly increased to 6.4% and 10%, respectively, due to traffic crashes. In 2011, 4,457 pedestrians were killed in traffic crashes and 69,000 were injured. In 2012, 4,743 fatalities occurred as well as 76,000 injuries.

According to the Nevada Strategic Highway Safety Plan (Nevada Department of Transportation, 2013), Nevada faces unique issues regarding pedestrians involved in traffic crashes. Between 2007 and 2011, 227 pedestrian fatalities and 881 injuries occurred. These problems – both nationally and in the State of Nevada – demonstrate the urgent need to provide information and education regarding safety on the roads. Although driver education is a great way to emphasize that drivers need to be aware of their surroundings, in places where pedestrians are walking on the streets, these traffic fatalities and injuries continue to be a major problem in Nevada. Solutions must focus not only on drivers but also on the pedestrians who share the road with them.

The aim of this second survey was to examine the opinions and attitudes of drivers and pedestrians about the quality and safety of the traffic environment in Nevada. A copy of the survey is provided in Appendix B of this report.

The survey focused on:

1. The effectiveness of the crosswalks,
2. The attention and respect that drivers and pedestrians give to each other, and
3. Their assessment of the current laws and penalties given for violations made by drivers and pedestrians.

The sample was taken primarily from Clark County in Southern Nevada. Participants were selected randomly in public areas, such as at the main campus of the University of Nevada, Las Vegas; workplaces; and the streets.

Demographics

A total of 148 people volunteered to take part in the survey. From this group, 107 residents were from Las Vegas, 39 from Henderson, and two from North Las Vegas. Of these volunteers, 65 were males and 83 were females. They ranged from 18 to 68 years of age with a mean age average of 25.84 years and a standard deviation of 8.647 years. Four people chose not to respond to question regarding age. From those taking the survey, 138 responded 'yes' to being able to drive and 8 responded 'no' to not being able to drive.

Results

The survey questions consisted of a Likert-type response, with only five choices for each question. In order to determine people's opinions and attitudes, these choice/rating responses corresponded to a certain number, shown in parentheses in the graphs in this section. To conduct the statistical analysis, a one-sample *t*-test was used to determine whether the sample means were statistically different from the criterion value; in this case, '3' represented a neutral response. i.e., being impartial to the questions asked. People who did not give any response to a question were excluded from the analysis.

The findings showed no sex differences ($p > .05$) in the responses for each question; therefore, the questions were analyzed as an entire group. The results from the survey questions are shown below.

As shown in Figure 12, the results from the sample indicated that people rated the crosswalks in Nevada as being somewhat effective, $t(144) = 6.762, p < .001$. The mean score for their rating responses was at 3.43 ($SD = .761$).

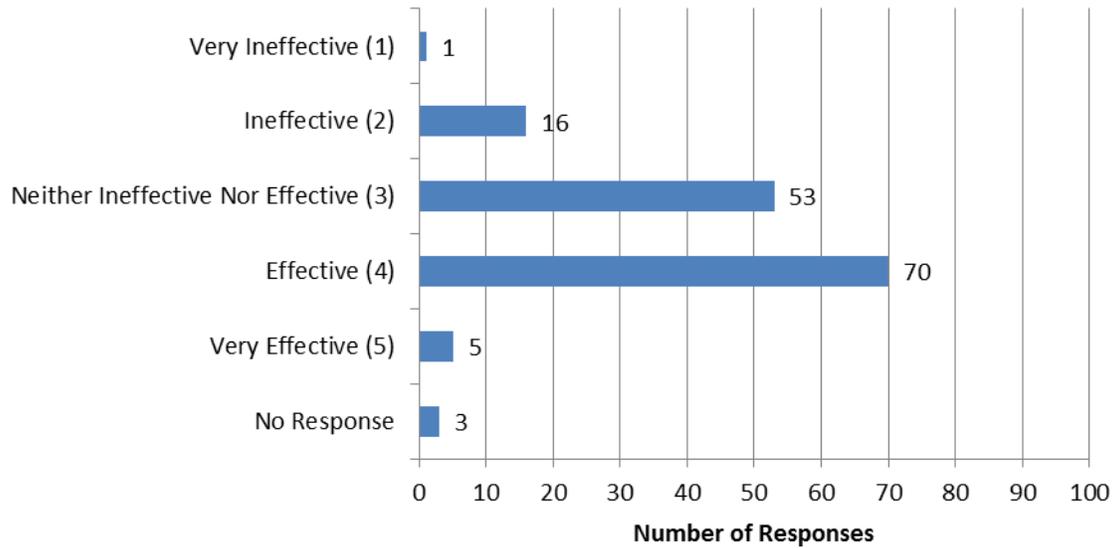


Figure 12 How would you rate the effectiveness of the crosswalks (e.g., stop signals for people) in Nevada?

In Figure 13, although there was only a marginal statistical significance for their responses about how attentive drivers are to pedestrians crossing the street, $t(144) = -1.625, p = .106$, the patterns appear split between people who say that drivers are inattentive and people who have no opinion at all. The mean score for their rating responses was 2.89 ($SD = .817$).

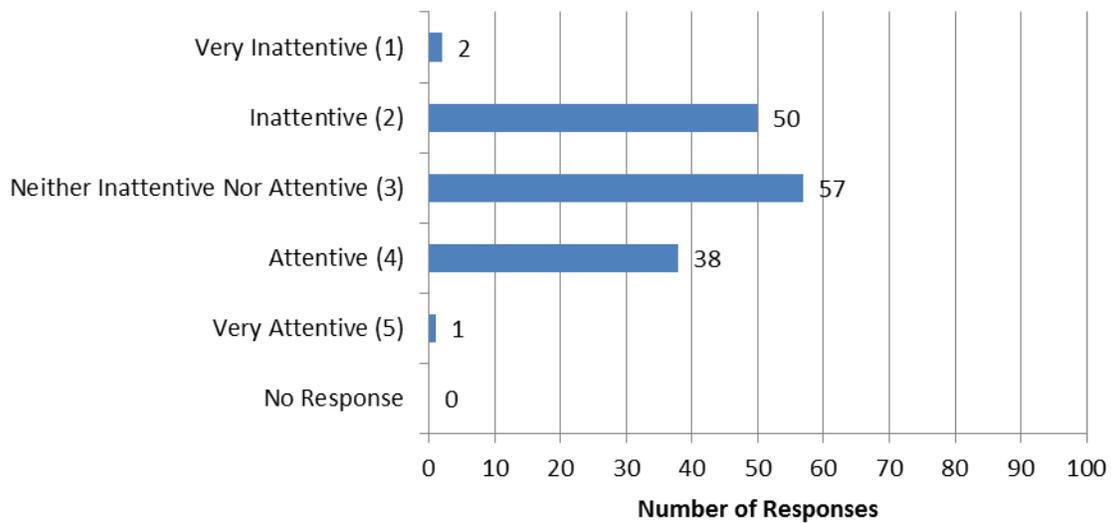


Figure 13 How would you rate how attentive drivers are when pedestrians cross the street?

As shown in Figure 16, there was no statistical difference in response for people’s attitudes about the safety of crossing at a crosswalk, $t(144) = 1.178, p = .241$. People felt neither unsafe nor safe (M rating score = 3.08, $SD = .846$).

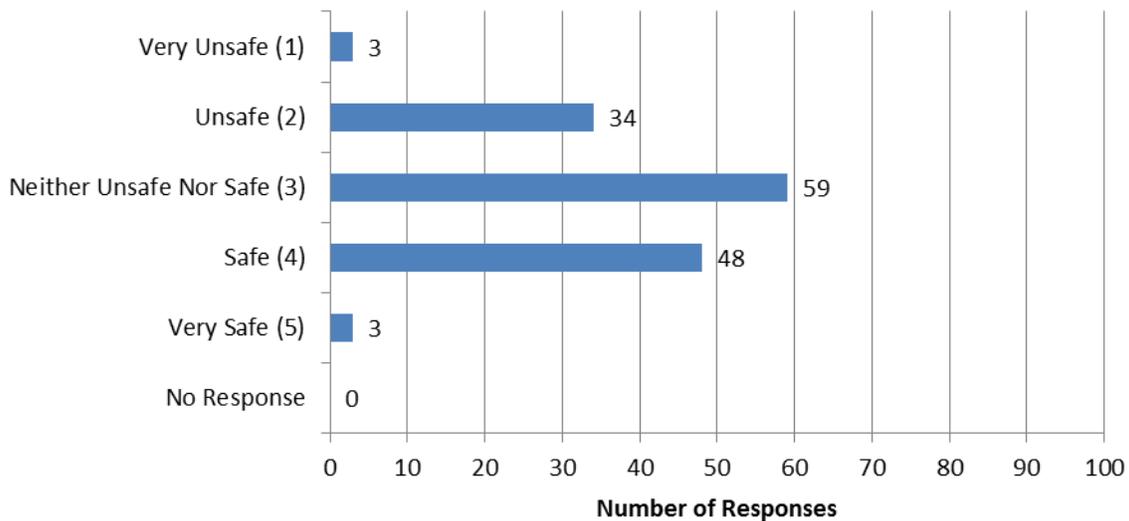


Figure 14 How safe do you feel when crossing the crosswalk?

Figure 15 indicated a marginally significant difference in people’s response about the respect drivers give to pedestrians when crossing the street, $t(144) = -1.608, p = .110$. The mean score for their rating responses was 2.88 ($SD = .878$), somewhere between being disrespectful and being neutral in their opinion.

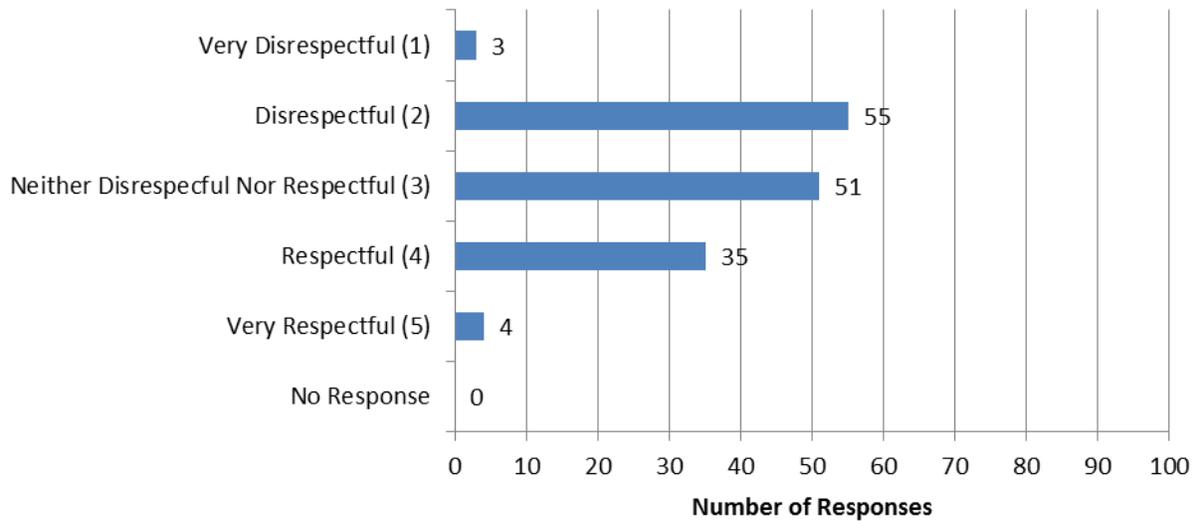


Figure 15 How respectful do you feel drivers are to pedestrians when crossing the streets?

Although there was no significant difference in people’s responses about the respect pedestrians give to drivers, $t(144) = -1.260, p = .210$, the graph in Figure 16 showed an interesting pattern. When comparing the combined ‘very disrespectful’ and ‘disrespectful’ responses to the combined ‘respectful’ and ‘very respectful’ responses, more responded that pedestrians were more disrespectful ($n = 45$ people) than respectful ($n = 38$ people). The mean score for their rating responses was 2.90 ($SD = .923$), which indicated that pedestrians had ‘neither disrespectful nor respectful’ attitudes about drivers on the street.

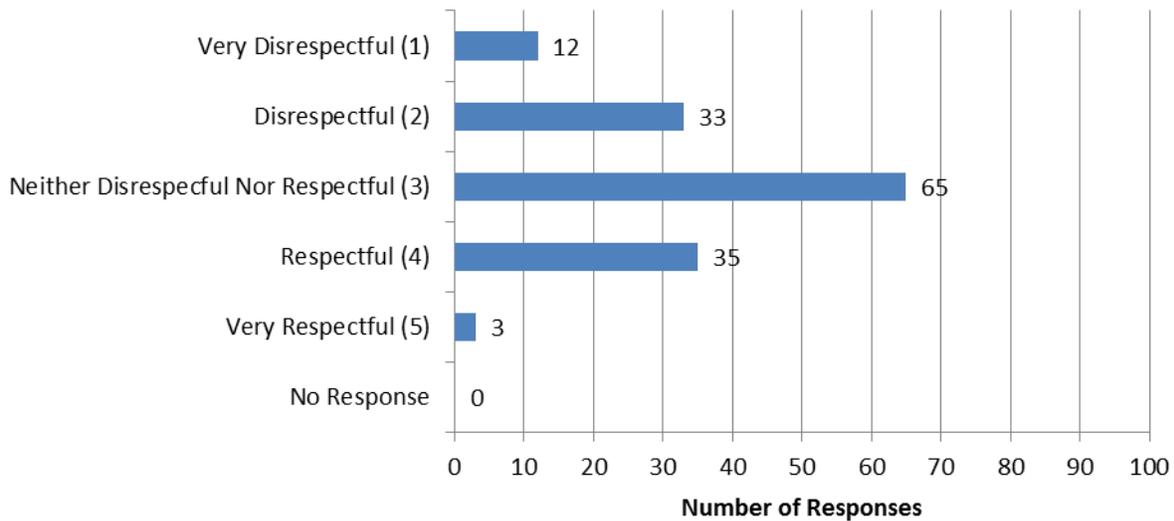


Figure 16 How respectful do you feel pedestrians are to drivers on the streets?

Based on the sample in the survey (Fig. 17), pedestrians ‘rarely’ jaywalked, $t(144) = -8.251, p = .001$. The mean score for their rating responses was 2.34 ($SD = .966$).

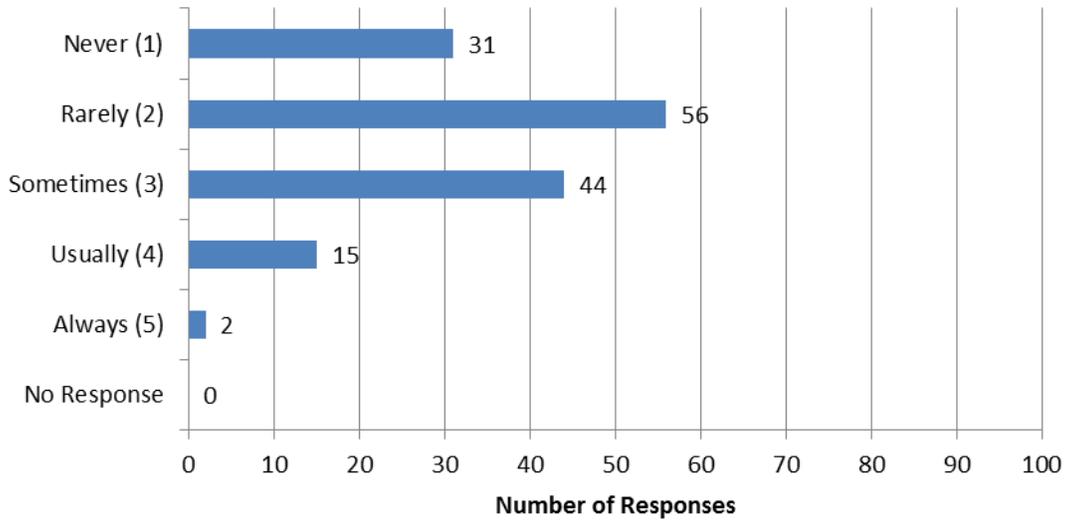


Figure 17 How often do you jaywalk (i.e., cross the street in a non-designated crosswalk?)

Figure 18 shows a significant difference in people’s responses about whether they felt pedestrian crossings in Nevada needed to be improved, $t(144) = 11.379, p = .001$. The mean score for their rating responses was 3.80 ($SD = .847$), indicating that more people agreed to having improvements made to the crosswalks. Some people provided additional information about what improvements should be done for the crosswalks; some of these suggestions are provided in the Recommendations and Future Directions section of this report.

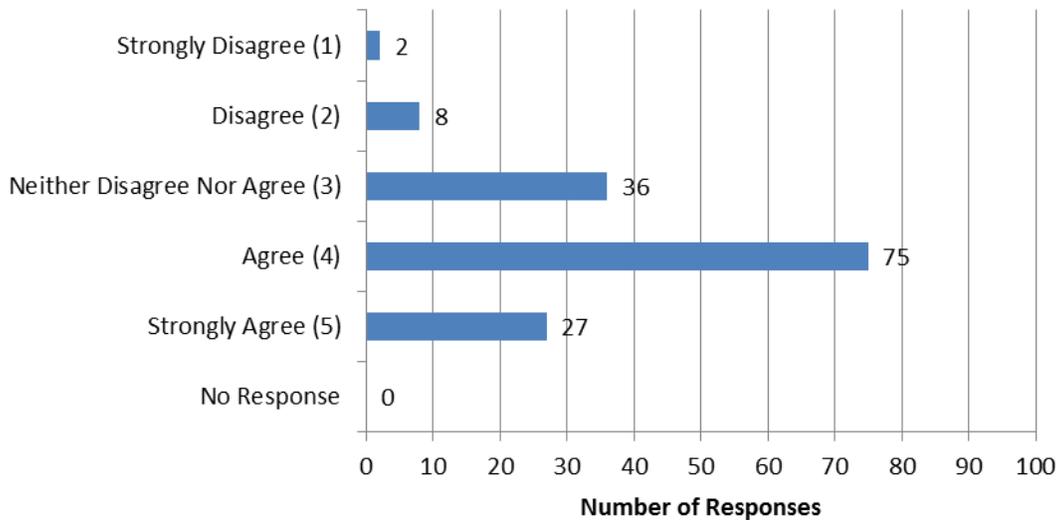


Figure 18 Do you feel that the pedestrian crossings need to be improved in Nevada?

As seen in Figure 19, people, on average, were more likely to agree that there should be a stricter law or penalty for drivers passing the crosswalk when the pedestrians have the right of way, $t(144) = 8.576, p = .001$. The mean score for their rating responses was 3.66 ($SD = .930$).

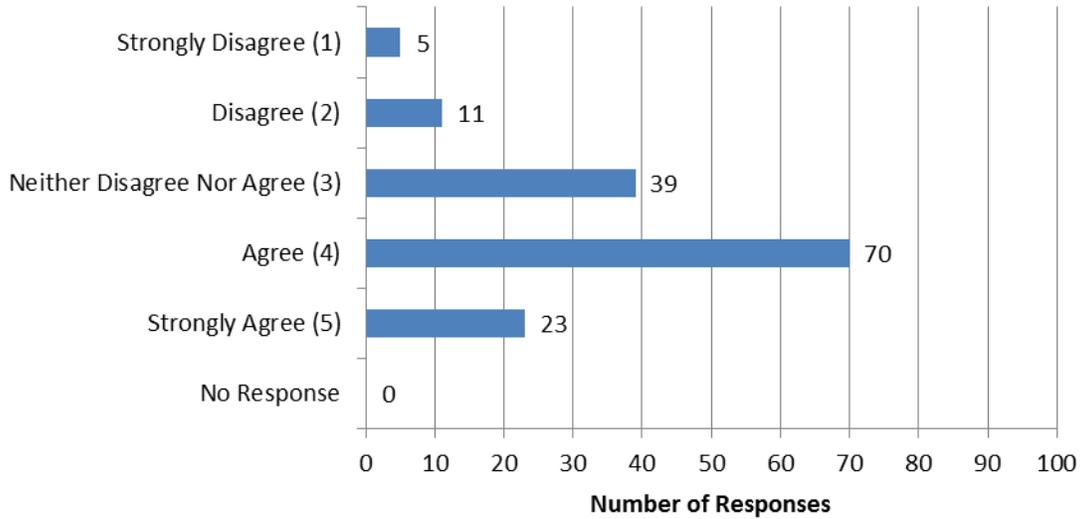


Figure 19 Do you feel that there should be a stricter law / penalty for drivers passing the crosswalk when the pedestrians have the right of way?

As shown in Figure 20, results indicated that people agreed to the idea that there should be a stricter law or penalty for pedestrians who jaywalk and do not follow the rules for crossing, $t(144) = 9.623, p = .001$. The mean score for their rating was 3.78 ($SD = .975$).

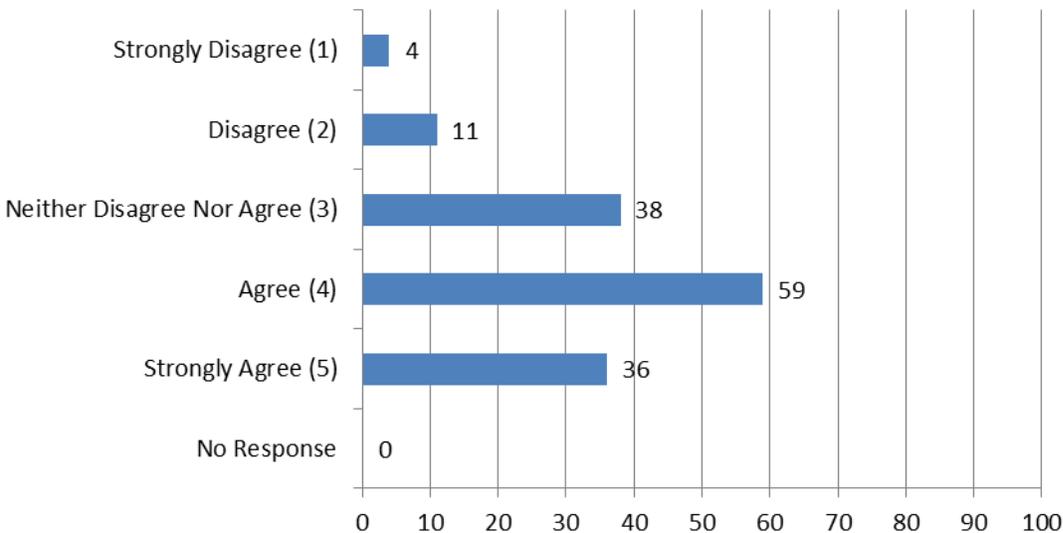


Figure 20 Do you feel that there should be a stricter law / penalty for pedestrians who do not follow the rules of crossing in designated crosswalks (e.g., jaywalking)?

RECOMMENDATIONS

This part of the report aims at suggesting recommendations to make improvements in the existing driver education programs in the State of Nevada. The recommendations have been developed from:

- I. Results of the surveys conducted in this study, which clarifies the limitations and what efforts are needed.
- II. Assessment of randomly selected programs in Nevada for online driver education.
- III. Recommendations /conclusions in similar studies, particularly those that conducted in the U.S.

The recommendations are broken down into seven major categories:

1. Ease/Lack of Rigor of Online Driver Education
2. Interactive Learning and Technology
3. Follow-up Exams
4. Practice/Training at Home
5. Collecting Information about Crashes
6. Pedestrians
7. Additional Emphasis

The following sections describe, elaborate, and explain the motivation for each of these recommendations. It is important to note that the research literature on driver education and adolescents describes a number of factors that contribute to crashes that cannot be included in policy recommendations. For example, it has been determined that such factors as gender (Williams, 2003), personality (Lang et al., 1996), and socio-economic/education status (Bingham et al., 2005) affect the likelihood of adolescent drivers being in a crash. However, because these types of factors cannot be included in testing, the corresponding policies or laws are not considered in this report. The following sections include recommendations that can be implemented to improve driver education.

1. Ease/Lack of Rigor of Online Driver Education

One of the results from *Part I: A Survey on the Effectiveness of Driver Education* showed that the courses the students took were considered to be very easy. For instance, many teenagers opted to complete their Certificate of Completion for the driver education course online, even though 52.4% of them admitted that if they were to re-take driver education, they would do so with an in-person course. One problem – and this has been observed for high school as well as higher education – is that students tend to have a preference for online courses, but because the development of online courses still is fairly new, they tend to be slightly easier than traditional courses. Specifically, the information that students receive is given in a way that does not require much thought on their part. The questions that they are asked are simplified; typically, multiple-choice is used, which tends to be easier than other

options; the answers are readily available; and generally, the material does not require deep memorization or critical thinking.

In the driver education online courses assessed, there were time limits for the driving as well as the tests. However, the time limits observed were very generous; for example, 40 to 60 minutes were given for work that may sometimes took only 20 minutes. In addition, students may not have taken the courses as seriously as they need to, especially when no one was monitoring their learning. They may have gone through the motion of encoding the information and storing those details temporarily in their memory just to pass a given test about the topic they have read.

One solution could be to incorporate cumulative tests throughout the entire course. Although a final test for obtaining the Certificate of Completion usually is cumulative – i.e., testing everything that they learned) – as they go through all of the various topics online, these cumulative tests should be given every time they finish a section. By doing so, it would ensure that students do not forget what they have learned in the previous topics. According to researchers in cognitive psychology (Roediger et al., 2010; Roediger and Karpicke, 2006), this type of repeated testing strengthens memory over time. While repeated testing typically is thought of as a way to evaluate what was learned, research has shown that it also improves learning.

Another possible solution is to use better methods to assess student learning. Short-answer questions or essay questions are more challenging than multiple-choice or true/false questions because they require people to recall the information rather than simply guess or recognize a concept that is presented. Short-answer or essay questions are more difficult to score. However, due to the low maintenance costs of an online course, once it has been created, resources could be used to hire people to score these types of questions.

A summary of recommendations regarding Ease/Lack of Rigor of Online Driver Education are:

1. Make online driver education courses more challenging.
2. Develop a more accurate assessment of the time spent completing topics. Time that currently is wasted can be filled with other learning activities (see below).
3. Use cognitive techniques, such as frequent tests and cumulative tests.
4. Avoid multiple-choice questions.
5. Improve the validation process of who actually is completing the online course by means of technological fixes or by having the final exam given at a testing location.

2. Interactive Learning and Technology

This recommendation deals with the fact that driver education programs conducted online may suffer from lack of interaction that comes from people learning from an instructor. One possible solution would be to provide a hybrid form of online learning. Instead of only having students go through an online course, they would have to meet with a

driver instructor who can provide them with more valuable information about driver safety. By having students communicate with an instructor, the instructor can determine whether the student actually learned the necessary knowledge for driving safely and offer them advice about various driving situations. Having both online and instructor-based learning may help motivate teenage drivers to take the knowledge that they have learned more seriously.

To improve driver education programs, the training should be put into practice. Although teenage drivers may or may not have their instruction permits to practice driving, exposure to a technology, such as a driving simulator, may help expose them with dealing in hazardous conditions and other traffic situations. According to Oblinger and Oblinger (2005), those born after 1982 may benefit in visual-spatial types of learning because they are more accustomed to such stimuli as virtual video games. By placing students in a driving simulator as part of their driver training, they can build more experience in a safe environment and view the consequences of unsafe driving at the same time. In addition, driving simulators can be programmed so that certain locations in Nevada where vehicle crashes often occur can be simulated in front of the computer screen. Thus, students are able to put themselves in those conditions and become familiar with what to do in those given situations. However, further research is needed to see if the practice they gain from these driver simulators transfers to actual driving experience.



A device used to train drivers by simulating unsafe driving conditions.



Video games designed especially to train drivers on how to obey traffic signs.



Teaching driving through animation and visual displays.

Figure 21. An example of a driving simulator.

Because simulators are expensive and the technology is not readily available, an alternative recommendation would be to include animated activities in which people can practice driving skills online. Rather than passively learning information by reading, people can see skills and/or driving conditions being demonstrated as well as practice the skills themselves.

Currently, UNLV is developing an online course that provides more active learning as well as hands-on experience. An example of active learning would be to demonstrate – by using a mouse clicker – the consequences of speeding and not attending to the road. In this application, people are given different driving scenarios on the computer screen to demonstrate how speed and distance can affect the time it takes them to press on the brake in order to stop before hitting a visible object.

In addition, these online driving scenarios can be used to show how driving distractions, such as talking on the cellphone or texting, can cause negative effects. For instance, a person can be asked to hold a cellphone in one hand and use the mouse clicker with the other. In this online driving scenario, the person is instructed to text 'hello' on their cellphone at random times while they watch out for objects on the computer screen while 'driving'. During texting, they must remember to click on the mouse to stop themselves from hitting an object from the simulated road. After each mouse click, they are shown how long it took them to click on the mouse, how long in terms of distance it took them to stop, and how likely they were to hit the object under actual driving conditions.

By using these animated activities, people can stay engaged in the topic and understand the consequences of unsafe driving. Our research reveals that even though people have been informed that cell phone use and texting are illegal and can impair driving, they still engage in that activity. If, in addition to reading about it in their online course, people actually see the detrimental effects of distracted driving on their own performance in one of these activities, they may be less likely to engage in those activities when actually driving.

In summary, regarding Interactive and Learning Technology:

1. Rather than using online-only courses, create hybrid courses that require students to learn from an instructor.
2. Another possibility is to use driving simulators in addition to the instructions received online.
3. Convert online courses from passive learning to active learning by including animated activities.

The research team has begun developing various web-based interactive teaching modules to study and demonstrate the potential of this recommended method. Appendix C and D provide various design considerations and the corresponding screen shots for a prototype implementation.

3. Follow-up Exams

Survey respondents indicated that one way to improve driver education is to include follow-up tests for X number of years after completing their driver education course. As mentioned in the first recommendation, the lack of difficulty and lack of a demand to know and maintain the information may cause students not to take seriously what they learn. These follow-up tests would be useful to remind drivers about rules and regulations that they may have forgotten over time. With the prominence and easy accessibility of technology today, testing could be done in a somewhat simple and cost-effective manner by using online programs and/or cellphone applications.

A solution for the follow-up exams would be to test experienced drivers after a certain number of years when they must renew their driver license. Similar to how people must take a knowledge (written) test to receive a driving permit, they would have to answer questions before getting their license renewed. All of the questions would be based on the most up-to-date *Nevada Drivers Handbook*. Currently, for the written test, people must answer 50 questions and get 80% (40 out of the 50) of the responses correct (Nevada Department of Motor Vehicles, 2014). This criterion to pass the test may be too lenient for experienced drivers. Because drivers seeking to renew their

licenses should know the information very well at this point, they should be required to pass with at least 90% or a total of 45 out of the 50 questions correct. Failure to pass this renewal test after three tries would result in them having to take a driver education course and to repeat the same process as does a new driver.

In summary regarding Follow-up Exams:

1. Provide follow-up exams to make sure that people are currently aware of the driving laws and regulations before getting their driver licenses renewed.
2. Restrict how many questions they can miss on the follow-up exam before getting their renewed license.
3. Failure to pass the follow-up exam would result in people having to take the driver education course and repeating the same process of a new licensed driver.

4. Practice and Training at Home

Mayhew (2007) recommended extending the amount of time that teenage drivers are required to take for driver education beyond the 30 hours currently required. Although this solution may have its benefits – for example, more time to learn the material – the problem is not so much the quantity of time needed to educate young drivers about safe driving but the *quality* of learning involved in the program. One way to improve this would be to require a certain number of hours in conjunction with acquiring certain skills, such as merging into highway traffic and parking. This could be accomplished by using the interactive driving education tools that we are proposing to replace or complement the existing training material and methods.

To instill good driving habits, an important part of this process is to make sure that the parents or guardians are well-trained to teach the young drivers how to drive properly. A workshop or tutorial provided in person or online can be beneficial for parents so that they know what the Nevada Department of Motor Vehicles expects from their supervision. By giving parents advice and important details about how they should monitor their children's driving behaviors, these driving practices can become more productive. For instance, parents can learn which driving techniques are most important to go over and what mistakes early drivers commonly make. In addition, this workshop can be a great opportunity for parents to relearn or refresh their memories of driving rules and regulations that they may have forgotten.

The Texas Department of Public Safety (2014) has provided an option for parents or guardians to get involved with their teenagers' driver education by allowing them to teach the driving course. This option is separate from the online or professional driver education courses typically offered. Although there is a fee involved to receive the Parent-Taught Driver Education (PTDE) packet, this alternative allows the parents and teenagers to go through the driver education and the behind-the-wheels training together. The parents or guardians must be approved first by the state before they are allowed to train the child. Specifically, the packet provides them with information about choosing an approved driver education course, teaching the course as mandated by the Texas laws, and learning how

the driver license process works. This program can be a helpful alternative for Nevada because parents would be given more responsibility for their teenager's learning and would have the ability to monitor the teenager's progress.

In summary, regarding Practice and Training at Home:

1. Instead of just requiring young drivers to complete a minimum number of hours, require the practice and completion of specific driving skills as well.
2. Include an online tutorial for parents that refresh them on some important driving skills/rules. This will help ensure that they are passing on correct information to their child as they practice driving with them.
3. Provide another option for driver education training, in which the parents or guardians are given a more active role in monitoring their teenager's learning.

5. Collecting Information about Crashes

Although driver education is an important part of addressing safety for young and early drivers, further research is needed to determine whether taking a driver education course reduces the likelihood of someone getting into a vehicle fatality or injury and/or committing other types of violations (e.g., driving under the influence, texting, talking on a handheld phone while driving). Research focused on the effectiveness of driver education mainly has been assessed indirectly through the number of accidents, age, time of day, and the number of hospitalizations. Currently, evidence is limited in whether taking a driver education course directly relates to fewer vehicle crashes and safer driving habits. Our recommendation would be for the police and / or the state to collect this information following a crash or violation.

Unfortunately, a recent policy change by the Las Vegas Metro Police Department (LVMPD) makes this recommendation more difficult. As of 2014, LVMPD does not respond to common collisions or crashes. While there may be a number of valid reasons for this policy change, it limits the ability to collect more data that could be used in the future to better analyze the effectiveness of driver education. Because of this difficulty in collecting better data, an alternative procedure would be to have the Department of Motor Vehicles record the type of driver education completed by an individual when people earn their driver license. By doing so, the information would be available for the state to use for research purposes without having to ask the person when he or she has experienced a crash or violation.

Another recommendation to determine successfully whether taking a driver education course affects a person's likelihood of getting into vehicle crashes may be through investigating insurance-based collision claims of that person. By collaborating with insurance companies and collecting this information anonymously, these findings can be used to improve the driver education programs. Specifically, the differences between vehicle crashes of those who have taken a driver education course and those who have not taken one can be assessed. The results of such an evaluation could provide insights in what needs to be emphasized in order to teach safer driving habits.

In summary with regarding to Collecting Information about Crashes:

1. Retrieve more information about people's participation in a driver education program by having it recorded as part of a police report.
2. Document people's driver education background when they apply for a driver license.
3. Collaborate with insurance companies to examine the types of vehicle crashes people commit between those who have taken and not taken a driver education course.

6. Pedestrians

Pedestrian fatalities and injuries caused by traffic crashes continue to be a major problem in Nevada. Although drivers must be responsible for the safety of others on the road, pedestrians should be more cautious and take greater responsibility to keep their lives from being endangered. In our second survey, people indicated that the crosswalks are somewhat effective but could be improved. Several solutions can be developed to prevent and reduce the possibility of traffic fatalities or injuries between drivers and pedestrians on the streets or crosswalks. Regarding the driver education programs, a continued emphasis should be placed on teaching people to respect both drivers and pedestrians.

According to the survey results, people in the sample seemed to view drivers and pedestrians as being disrespectful to each other on the roads. By teaching students to take the perspective of someone who is a driver as well as a pedestrian, they may increase their awareness of both groups sharing the road and remind them that drivers and pedestrians must be responsible for each other's safety. Teaching people in driver education to adopt the perspective of a pedestrian and to consider how pedestrians would want drivers to behave may cause people to think more critically about their own driving behaviors.

Another solution would be to incorporate more signs near traffic signals that caution pedestrians about crossing the streets. Although most of the people on the survey indicated that they 'rarely' jaywalk (i.e., cross on non-designated areas), 41% of them mentioned that they 'sometimes', 'usually', or 'always' jaywalk. This issue is a serious concern because fatalities and injuries can be prevented by pedestrians themselves, as safety is not just the responsibility of the drivers. Adding signs near traffic signals reminding pedestrians that they should take some responsibility on the streets may help increase awareness about traffic safety.

Changes to the infrastructure of the streets can help improve driver and pedestrian safety. For instance, more lighting in the surrounding areas of a crosswalk may be helpful at night. Similarly, just as some stop signs have red blinking lights surrounding their octagonal shapes, increasing lighting near traffic signals may cause both drivers and pedestrians to be more attentive. Another possibility would be to use flashing red lights at crosswalks. Currently, most crosswalks use flashing yellow lights that signal the driver to proceed with caution; however, if a pedestrian is crossing, a flashing red light that signals drivers to stop may be more appropriate.

Although it may be costly, another possibility would be to add some form of barrier (e.g., fences) near the edge of the sidewalks that can help direct pedestrians to know where not to cross the street, thus reducing the chances of

drivers crashing into a pedestrian. This would not have to be a full-sized fence; however, it needs to be something symbolic in order to convey that it is not appropriate to cross at that point. Along this line of thought, many sections of road have concrete medians near the turning lanes; an unintended side effect of these concrete medians is that it gives pedestrians a ‘safe zone’ away from automobiles at the halfway point of crossing the street. Placing barriers on these or re-shaping them so that they were more difficult to stand on may discourage people from crossing at these locations.

Finally, it is important to make sure that both drivers and pedestrians safely share the road; this can be done by implementing stricter laws or penalties. According to the survey sample, most agreed that there should be punishments to drivers who violate the pedestrian’s right of way to cross the street as well as to pedestrians who choose to jaywalk when drivers have the right of way. By increasing the fines – similar to driving while using the cellphone – these violations may help drivers and pedestrians become more aware about putting safety first.

In summary, regarding Pedestrians:

1. Through the driver education program, emphasize information about drivers and pedestrians sharing the road and being vigilant of each other’s safety.
2. Place more cautionary signs for pedestrians on the streets to remind them of their own safety.
3. Improve the infrastructure of the streets by using more lighting near traffic signals or providing barriers to prevent people from illegally crossing the streets or drivers hitting them.
4. Implement stricter laws for people who violate the driver or pedestrian rights of way by increasing the fines.

7. Additional Emphasis

A major concern of Driver Education Programs in Nevada is how well the young and early drivers maintain their awareness of driver safety over time. An important topic addressed in driver education courses concerns driving distractions. Although students are taught about the dangers of driving while being involved in other activities – texting, talking on the cellphone, and driving under the influence of alcohol and other drugs – greater action is needed to ensure that these drivers continue to be reminded that distractions can cause negative and unwanted consequences. Specifically, they need to understand that these distractions can lead to vehicle crashes and endanger the safety of themselves and others on the road. Although driving laws have been enforced to prevent people from distractive or impaired driving, the use of fines as a threat may not be enough.

According to the National Highway Traffic Safety Administration (2013), drivers in their 20s were likely to get into vehicle fatalities due to distractions, such as using cellphones while driving. In their website (<http://www.distraction.gov/>), they reported that 71% of teenage and young adult drivers were likely to send text messages while driving, and 78% were likely to read them while driving. Moreover, impaired driving is a concern for young drivers. Although underage drinking is illegal in Nevada – that is, going above a blood alcohol concentration of .02% for those who are under 21 years old – about 24% of those between age 15 and 20 have been

involved in vehicle crashes due to drinking (National Highway Traffic Safety Administration, 2009). With these unsafe driving behaviors, more awareness is needed on the road to remind young drivers about the lives they endanger.

We recommend continued emphasis on impaired driving due to the effects of alcohol and drugs. Compared to cell phone / texting activity, the rate of driving under the influence was low; however, but this rate still could go lower. Unfortunately, while people are learning that cell phone use and texting are illegal, a clear majority of people responded that they engaged in these activities. This is particularly disturbing when research has shown comparable deficits in driving performance for alcohol and cell phones (e.g., Strayer et al., 2006). Driver education needs to do a better job of teaching drivers that besides being illegal when driving, cell phone use and texting can significantly impair driving performance. Sometimes the use of alcohol and drugs are associated with such words as ‘sin’ or ‘vices’; as a result, many people recognize that this type of behavior may not mix well with driving. However, cell phone use and texting is thought of as a perfectly acceptable everyday behavior; this attitude may carry over to driving. This emphasis on distracted driving could be achieved by presenting more information in a course and by using interactive applications that demonstrate how these impairments affect driving, as described earlier.

A final recommendation is to provide more advertisements on the streets to remind all drivers about the dangers of being distracted or impaired while driving. These advertisements can be posted on billboards and posters near bus stops and buildings. However, emphasis should be made not only on what not to do but also on the outcome of being involved in unsafe driving. For instance, by reminding drivers about how much they have to pay in fines and what vehicle crashes look like, they constantly would be reminded of the consequences while they drive. In addition, more public announcements through television and magazines can be useful for targeting a younger population about driver safety. By increasing awareness about distracted or impaired driving in their environment, young drivers will have no excuse for not being responsible.

In summary, regarding Additional Emphasis:

1. Continue and/or increase the emphasis on the dangers of driving under the influence of alcohol or drugs.
2. Greatly increase the emphasis on the dangers of cell phone use and texting on driving. Drivers need to understand that cell phone use and texting can impair driving to similar extents as alcohol. As mentioned earlier, demonstrations of these effects by using interactive applications may help.
3. Address the dangers of distractions on the road through public announcements, such as billboards, television commercials, and magazines.
4. Remind drivers about the penalties and fines involved for disobeying the law (e.g., texting while driving) by posting more signs on the road about them.

CONCLUSION

Nevada's Driver Education Program is an important tool to promote awareness of driver safety with the objective of reducing or eliminating the number of traffic fatalities and injuries in the state. Survey data reveals that some people seem to have acquired the necessary knowledge for driving safely; however, they do not use that knowledge. The driver education program needs to have greater quality with regard to the learning process.

One of the biggest concerns is that the courses are not challenging enough for young drivers for them to realize adequately that driving is a privilege, not a right. More cumulative testing in these courses may have a beneficial effect to ensure that students remember what they learn in their driving courses. In addition, more interactions are needed, most preferably in person rather than online. By communicating with an instructor, for example, young drivers can be made aware of their strengths and weaknesses in learning how to drive. In addition, parents can actively get involved with their teenager's driver education by working on the course with their teens. The use of workshops or tutorials can inform parents of what they need to know to help their teenager learn to drive safely.

With the use of technology, students can enhance their understanding of their driver education program. One way to do this is by incorporating driver simulators into the program so that they can experience firsthand various driving situations in a safe environment. Another way that might be less costly is to use interactive animations in an online course instead of relying heavily on text to learn the materials. For example, in simulated traffic situation on the computer, students can use the mouse clicker to learn the effects of distance and time needed to stop from hitting an object. The research team has begun developing various web-based interactive teaching modules to study and demonstrate the potential of this recommended method. Appendix C and D provide various design considerations and the corresponding screen shots for a prototype implementation.

Because drivers may forget over time the knowledge that they have learned from driver education, one recommendation is to provide follow-up exams. When they need to renew their driver license, they could be tested on the driving rules and regulations. The testing would be based on the current *Nevada Drivers Handbook*. Failure to pass the exam after three tries would result in the person having to go through a driver education course and repeating the procedure of getting the license, the same as a new driver.

Further data collection is needed to determine if people's participation in a driver education course helps to reduce the chances of vehicle fatalities and injuries. Currently, empirical evidence is limited to indirect results from records of the number of accidents, age, time of day, and the number of hospitalizations. One solution is to have the information about whether drivers have taken a driver education program through police reports, the Department of Motor Vehicles, or insurance companies.

Although the driver education program focuses more on the driver, additionally, it may be beneficial to inform people about pedestrian safety. By emphasizing that drivers and pedestrians share the road equally, this awareness may help reduce the number of car accidents and injuries in Nevada. Further, by changing the infrastructure of the

streets – adding more lighting near traffic signs at night, providing more warning signs for pedestrians, and building barriers to prevent people from jaywalking – this solution may help drivers and pedestrians avoid dangerous interactions.

Finally, due to the dangers of driving distractions (texting and calling on the cellphone) and impairments (driving while under the influence of alcohol or drugs), more emphasis on these topics in driver education – as well as more public announcements through billboards, television commercials, and magazines – can help to constantly remind drivers about having good driving habits. Even though it is important to address what they should not do while driving, they also need to understand what they face as a consequence of being distracted or impaired: being fined or going to jail. Training that includes seeing images of car crashes may prove helpful.

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APPENDIX A

Drivers Education Online Survey

Informed Consent

Purpose of the Study

You are invited to participate in a research study. The purpose of this study is to examine people's driving experiences and behaviors.

Participants

You are being asked to participate in this study because you are at least 18 years old, have an instruction permit or driver license, and can fluently speak / understand English.

Procedure

If you participate in this study, you will be asked a series of questions regarding your driver's education experience and your driving habits. The entire survey should take approximately 30 minutes.

Benefits of Participation

Other than learning about how surveys are conducted, the procedure has no direct benefits to you. However, your responses will help us learn about driver's training and driving habits.

Risks of Participation

The risks involved in this research are minimal. If, however, you feel uncomfortable at any point during the procedure, you may close out the survey at any time for any reason.

Cost / Compensation

There will be no financial cost to you to participate in this study. This survey will take approximately 30 minutes. You will be compensated for your time with 0.5 research credits that can be applied to a psychology course. The University of Nevada, Las Vegas may not provide compensation or free medical care for an unanticipated injury sustained as a result of participating in this research study.

Contact Information

If you have any questions or concerns about the study, you may contact Kris Gunawan at 702-895-5904 or Dr. David Copeland at 702-895-5213 or Dr. Alexander Paz at 702-895-0571. For questions regarding the rights of research subjects, any complaints or comments regarding the manner in which the study is being conducted, you may contact the UNLV Office of Research Integrity – Human Subjects at 702-895-2794 or toll free at 877-895-2794 or via email at IRB@unlv.edu.

Voluntary Participation

Your participation in this study is voluntary. You may refuse to participate in this study or in any part of this study. You may withdraw at any time without prejudice to your relations with the university. You are encouraged to ask questions about this study at the beginning or any time during the research study.

Confidentiality

All information gathered in this study will be kept completely confidential. No reference will be made in written or oral materials that could link you to this study. All records will be stored in a locked facility at UNLV for at least 5 years after completion of the study and at that time, the data will be archived anonymously.

Participant Consent

I have read the prior information and agree to participate in this study. I am at least 18 years old, have an instruction permit or driver license, and can fluently speak / understand English.

Yes, I agree to participate. No, I do not want to participate.

If you would like to receive 0.5 research credits for the subject pool, please enter the email you use from your Sona Systems account. Otherwise, you may continue to the next page. Please note that the responses that you provide in the survey will not be linked to your email address or name. Your responses to the survey will remain confidential and anonymous.

Part I: Drivers Education

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. What type of vehicle document do you currently hold?

- Instruction Permit (sometimes called Learner's Permit in some states)
- Nevada Driver License
- Out-of-State Driver License (please specify the state)

2. How old were you when you received your Nevada driver license?

- years old

3. On average, how much time do you spend driving a day?

- hour(s)
- minute(s)

4. Although you may be driving more than one type of vehicle, what kind of vehicle do you primarily drive?

- Make (e.g., Ford, Toyota, Honda, etc.) -----
- Model (e.g., Fusion, Camry, Civic, etc.) -----
- Year of the Model -----

5. If you received your driver license before the age of 18, where did you obtain a Certificate of Completion?

- Online Course
- High School
- A Professional Driving School (Certified by the DMV)
- Other (please specify): -----
- Not Applicable

6. If you obtained a Certificate of Completion when you were 15-, 16-, or 17-years-old, please rate the effectiveness (i.e., how much you learned) for the following topics in your driver's education program on a scale from 1 (Very Ineffective) to 5 (Very Effective). If you did not take a driver's education program, click "Not Applicable" for each item.

a) Teaching you the skills to drive in a vehicle

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective
- Not applicable

b) Teaching you the traffic rules and laws

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective
- Not applicable

c) Teaching you how to deal with hazardous conditions

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective
- Not applicable

d) Teaching you how to purchase a vehicle

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective
- Not applicable

e) Teaching you the process of obtaining a driver's license

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective
- Not applicable

7. If you obtained a Certificate of Completion when you were 15-, 16-, or 17-years-old, please rate how well each of the following topics were covered in your training. Please rate from 1 (Not Covered At All) to 5 (Covered Extremely Well). If you did not take a driver's education program, click "Not Applicable" for each item.

a) Respecting the traffic rules and laws (e.g., not speeding, not texting, etc.)

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

b) Controlling negative emotions (e.g., anger) while driving

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

c) Knowing how to deal with risky driving conditions (e.g., severe weather conditions)

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

d) Being a considerate and safe driver

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

e) Planning driving route ahead of time (i.e., considering time of day, best route, etc.)

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

f) Avoiding and dealing with distractions while driving

- Not Covered At All
- Covered Slightly
- Moderately Covered
- Covered Fairly Well
- Covered Extremely Well
- Not applicable

8. If you completed a drivers education program, immediately afterward, how much did safety motivate your driving habits and behaviors? If you did not take a drivers education program, click "Not Applicable".

- Safety did not motivate my driving at all
- Safety was a minor concern while driving
- Safety was moderately important to me while driving
- Safety was an important influence on my driving
- Safety was my top priority while driving
- Not Applicable

9. Who helped prepare you for the written test? (Select all that apply.)

- Myself through the DMV Manual
- Online Course
- High School
- Parent(s) / Relative(s)
- A Certified Instructor from a Professional Driving School
- Other (please specify): -----

10. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training by yourself through the DMV manual?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

11. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training through the online course?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

12. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training through high school?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

13. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training through your parent(s) or relative(s)?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

14. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training through a certified instructor from a professional driving school?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

15. How effective was your preparation (i.e., how much did you learn and remember) for the written test getting training through the source you selected?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

16. Who taught you to drive behind-the-wheel (i.e., learning to drive a vehicle) ? (Select all that apply.)

- Parent(s) / Relative(s)
- Certified Instructor from a Professional Driving School
- A Driving Simulator
- Other (please specify): -----

17. How effective was your behind-the-wheel training (i.e., how much did you learn and remember the driving skills) through your parent(s) or relative(s)?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

18. How effective was your behind-the-wheel training (i.e., how much did you learn and remember the driving skills) through a certified instructor from a professional driving school?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

19. How effective was your behind-the-wheel training (i.e., how much did you learn and remember the driving skills) through a driving simulator?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

20. How effective was your behind-the-wheel training (i.e., how much did you learn and remember the driving skills) through the source you selected?

- Very Ineffective
- Ineffective
- Somewhat Ineffective
- Neither effective nor ineffective
- Somewhat effective
- Very effective

21. During your driver's training, were you made aware of the following distractions that can affect your driving? (Select all that apply.)

- Texting on Cell Phone
- Talking on Cell Phone
- Passengers (e.g., friends, children, pets)
- Weather
- Environmental Factors (e.g., billboard ads, construction zones)
- Grooming (e.g., shaving) / Make-Up
- Driving Under the Influence of Alcohol
- Driving Under the Influence of Drugs
- Eating
- Other (please specify): -----
- None of the Above

22. Rate how much

awareness you were given about 'TEXTING ON CELL PHONE' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

23. Rate how much awareness you were given about 'TALKING ON CELL PHONE' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

24. Rate how much awareness you were given about 'PASSENGERS (E.G., FRIENDS, CHILDREN, PETS)' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

25. Rate how much awareness you were given about 'WEATHER' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

26. Rate how much awareness you were given about 'ENVIRONMENTAL FACTORS (E.G., BILLBOARD ADS, CONSTRUCTION ZONES)' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

27. Rate how much awareness you were given about 'GROOMING (E.G., SHAVING) / MAKE-UP' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

28. Rate how much awareness you were given about 'DRIVING UNDER THE INFLUENCE OF ALCOHOL' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much

- Far too much

29. Rate how much awareness you were given about 'DRIVING UNDER THE INFLUENCE OF DRUGS' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

30. Rate how much awareness you were given about 'EATING' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

31. Rate how much awareness you were given about 'OTHER' as a driving distractor in your training.

- Far too little
- Too little
- About right
- Too much
- Far too much

32. Do you feel that the topic of driving distractions is fully addressed in the current drivers education curriculum?

- Strongly Disagree
- Disagree
- Neither Agree nor Disagree
- Agree
- Strongly Agree
- I did not take a driver's education course.

Part II: Drivers Education

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. If you had to take a driver's education training, would you prefer an online or in-person class?

- Online Class
- In-Person Class

2. If you took a driver's education course, how would you rate the difficulty of the training?

- Very Difficult
- Difficult
- Somewhat Difficult
- Somewhat Easy
- Somewhat Effective
- Easy
- Not Applicable

3. If you took a drivers education course, how satisfied were you with learning how to drive?

- Very dissatisfied
- Dissatisfied
- Somewhat Dissatisfied
- Neutral
- Somewhat Satisfied
- Satisfied
- Very Satisfied
- Not Applicable

4. If you could practice using a driving simulator (i.e., a virtual reality driving machine), would you use it for the behind-the-wheel experience?

- Definitely will not
- Probably will not
- Don't know
- Probably will
- Definitely will

5. In retrospect, knowing what you know now, what would have made you better prepared to be a good driver when you first earned your license?

-

6. If you completed a driver's education program, what changes would you make to create better drivers? Please think about this in terms of what would improve driving quality, not how enjoyable it would be for the student. (Select all that apply) (If you did not complete a driver's education program, click "Not Applicable")

- Requiring an exit exam to graduate from the program
- Extending the required hours of classes / instruction one should take
- Extending the number of required driving hours (in general)
- Extending the number of required driving hours with an instructor
- Using a driving simulator to practice driving
- Including follow-up classes after students earn their license
- Taking an annual driving exam for X number of years after earning the license
- Improving the teaching methods in the classes
- Not Applicable

Part III: Driving Experience

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. In the past 12 months, has a police officer pulled you over (regardless of whether you received any ticket or warning)? If so, how many times have you been pulled over while driving? (Insert number below.)

----- times

2. Have you ever (including the past 12 months) been pulled over by a police officer (regardless of whether you received any ticket or warning)? If so, how many times have you been pulled over while driving? (Insert number below.)

----- times

3. In the past 12 months, how many times have you received a warning from a police officer for a violation (e.g., speeding, etc.)? (Insert number below.)

----- times

4. Have you ever (including the past 12 months) received a warning from a police officer for a violation (e.g., speeding, etc.)? If so, how many times have you received a warning? (Insert number below.)

----- times

5. In the past 12 months, how many times have you received a ticket for a violation (e.g., speeding, etc.)? (Insert number below.)

----- times

6. Have you ever (including the past 12 months) received a ticket for a violation (e.g., speeding, etc.)? If so, how many times have you received a violation ticket? (Insert number below.)

----- times

7. Have you ever committed any of the following violations while driving even if you did not get a ticket or warning for it? (Select all that apply.)

- Driving over the speed limit
- Driving below the speed limit
- Blocking a roadway
- Driving under the influence (e.g., drinking or using other drugs)
- Expired registration
- Texting on your cell phone
- Talking on the your cell phone
- Passing a school bus when its red lights are flashing
- Driving through the carpool lane without any passengers
- Other (please specify):
- None of the Above

8. How frequently do you use your cell phone WITH a headset while driving?

- Never
- Once or Twice
- Rarely
- Sometimes
- Majority of the Time
- Almost Always
- Always

9. How frequently do you use your cell phone WITHOUT a headset while driving?

- Never
- Once or Twice
- Rarely
- Sometimes
- Majority of the Time
- Almost Always
- Always

10. How frequently do you text on your cell phone while driving?

Never

- Once or Twice
- Rarely
- Sometimes
- Majority of the Time
- Almost Always
- Always

11. If you text on your cell phone while driving, when do you do the texting? (Select all that apply.)

- I text while I am driving the vehicle.
- I pull over and text.
- I text when I stop my vehicle during a traffic stop.
- Other (please specify):
- Not Applicable

12. How frequently do you use a GPS navigator while driving?

- Never
- Once or Twice
- Rarely
- Sometimes
- Majority of the Time
- Almost Always
- Always

13. How frequently do you eat while driving?

- Never
- Once or Twice
- Rarely
- Sometimes
- Majority of the Time
- Almost Always
- Always

Part IV: Driving Experience

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. In the past 12 months, how many vehicle accidents have you been involved in while driving?

- accidents

2. Have you ever (including the past 12 months) been involved in any vehicle accidents while driving? If so, how many vehicle accidents?

- accidents

3. If you had any accidents while driving, list the vehicle accidents that you have experienced? Otherwise, type 'Not Applicable'.

-

4. In the past 12 months, how many close calls (i.e., almost experiencing an accident) have you been involved in while driving?

- close calls

5. Have you ever (including the past 12 months) experienced any close calls (i.e., almost experiencing an accident) while driving?

- close calls

6. If you had any close calls, list the close calls that you have experienced? Otherwise, type 'Not Applicable'.

-

7. Have you ever driven under the influence of alcohol? As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set.

- Yes
- No

8. Please explain why you drove under the influence of alcohol or drugs. As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set. (Select all that apply.)

- The police officer would never notice, and I knew that I can get away with it.
- I did not have a designated driver.
- The distance to get home was not that far.
- I only felt buzzed; I was not that drunk.
- I do not care about the law.
- Other (please specify):
- Not Applicable

9. Have you ever driven under the influence of other drugs (e.g., prescribed or recreational drugs)? As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set.

- Yes
- No

10. Please explain why you drove under the influence of other drugs (e.g., prescribed drugs)? As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set.

- The police officer would never notice, and I knew that I can get away with it.
- I did not have a designated driver.
- The distance to get home was not that far.
- I do not care about the law.
- Other (please specify):
- Not Applicable

11. Have you ever driven while being close to falling asleep? As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set.

- Yes
- No

12. Please explain why you drove while being close to falling asleep. As a reminder, your response will not be linked to your identity. Your response will remain confidential and anonymous in a group data set.

-

Part V: Drivers Knowledge

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. To the best of your knowledge, is there a law in Nevada that bans the activity of eating food while driving?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

2. To the best of your knowledge, is there a law in Nevada that bans the use of ear buds or headphones while driving?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

3. To the best of your knowledge, is there a law in Nevada that bans the use of hand-held cell phones while driving?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

4. To the best of your knowledge, is there a law in Nevada that bans the use of hands-free cell phones while driving?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

5. To the best of your knowledge, is there a law in Nevada that prohibits driving under the influence of alcohol?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

6. To the best of your knowledge, is there a law in Nevada that prohibits driving under the influence of prescription drugs (e.g., painkillers, allergy medications, sleep aids, etc.)?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

7. To the best of your knowledge, is there a law in Nevada that prohibits driving under the influence of illegal drugs (e.g., marijuana, heroin, etc.)?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

8. To the best of your knowledge, is there a law in Nevada that bans dancing while driving?

- Extremely confident that there is no law
- Confident that there is no law
- Somewhat confident that there is no law
- Unsure
- Somewhat confident that there is a law
- Confident that there is a law
- Extremely confident that there is a law

Part VI: Drivers Knowledge

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. How familiar are you with the law about texting and talking on a hand-held cell phone while driving?

- Not at all familiar
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

2. What is the fine for driving while texting or talking on a hand-held phone? If you are unsure or do not know, please guess.

- \$50.00 for the first offense in seven years
- \$100.00 for the first offense in seven years
- \$150.00 for the first offense in seven years
- \$200.00 for the first offense in seven years
- \$250.00 for the first offense in seven years

3. After the first offense, what is the fine for driving while texting or talking on a hand-held phone? If you are unsure or do not know, please guess.

- \$50.00 for the second offense
- \$100.00 for the second offense
- \$150.00 for the second offense
- \$200.00 for the second offense
- \$250.00 for the second offense

4. After the second offense, what is the fine for driving while texting or talking on a hand-held phone? If you are unsure or do not know, please guess.

- \$50.00 for the third offense
- \$100.00 for the third offense
- \$150.00 for the third offense
- \$200.00 for the third offense
- \$250.00 for the third offense

5. How familiar are you with the law about driving under the influence of alcohol?

- Not at all familiar
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

6. What is the legal blood alcohol limit for drivers under 21 years of age in Nevada? If you are unsure or do not know, please guess.

- Percent of Blood Alcohol Content
- 0.02 Percent of Blood Alcohol Content
- 0.04 Percent of Blood Alcohol Content
- 0.06 Percent of Blood Alcohol Content
- 0.08 Percent of Blood Alcohol Content
- 0.10 Percent of Blood Alcohol Content

7. What is the legal blood alcohol limit for drivers for 21 years and older in Nevada? If you are unsure or do not know, please guess.

- Percent of Blood Alcohol Content
- 0.02 Percent of Blood Alcohol Content
- 0.04 Percent of Blood Alcohol Content
- 0.06 Percent of Blood Alcohol Content
- 0.08 Percent of Blood Alcohol Content
- 0.10 Percent of Blood Alcohol Content

8. How familiar are you with the law about stopping when a school bus displays its flashing red lights and stop sign while students are boarding the vehicle?

- Not at all familiar
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

9. How familiar are you with the law about stopping for a pedestrian at a crossing even when there is no stop light or stop sign present?

- Not at all familiar
- Slightly familiar
- Moderately familiar
- Very familiar
- Extremely familiar

10. In your opinion, which of the following restrictions on drivers who are under the age of 18 should be enacted to improve overall safety for everyone on the road (Select all that apply)?

- Restricting nighttime driving for drivers under 18
- Limiting the number of passengers in the vehicle when the driver is under 18
- Banning all cell phone use (hands-free and hand-held) for drivers under 18
- Not allowing people to drive at all until the age of 18

Part VII: Demographics / Background

Answer to the best of your ability. As a reminder, your responses will NOT be associated with your personal identity. Please be as honest and accurate as possible.

1. Sex:

- Male
- Female

2. Age:

----- years old

3. Ethnicity: Select all that apply.

- American Indian or Alaska Native
- Asian
- Black or African American
- Hispanic or Latino/a
- Native Hawaiian or Other Pacific Islander
- White or Caucasian
- Other (please specify):

4. Grade Level:

- Freshman
- Sophomore
- Junior
- Senior
- Post-Baccalaureate
- Graduate School
- Other (please specify): -----

5. Relationship Status:

- Single
- In a Relationship
- Married
- Divorced
- Widowed

6. Living Arrangement:

- On-Campus
- With Family
- Alone Off-Campus
- With Roommate(s) Off-Campus

7. In which city do you live?

- Las Vegas
- North Las Vegas
- Henderson
- Other (please specify): -----

8. Approximately how many miles do you drive each day?

- Sunday (miles): ----
- Monday (miles): ----
- Tuesday (miles): ----
- Wednesday (miles): ----
- Thursday (miles): ----
- Friday (miles): ----
- Saturday (miles): ----
- Total : ----

9. Approximately how many hours a day do you sleep?

- hour(s)

10. How long have you lived in the State of Nevada?

- Year(s)
- Month(s)

11. Number of vehicles in your household:

- vehicle(s)

12. What is the highest level of education in your household?

- High School Diploma / G.E.D.
- Some College / Currently in College
- College Degree (e.g., B.A., B.S., A.A., A.S.)
- Graduate Degree (e.g., M.A., M.S., Ph.D., M.D.)
- None of the Above

13. What is the approximate income level in your household?

-

14. If you play video games, how many hours per week do you play the following types of games?

- Role-Playing Games (e.g., World of Warcraft, Final Fantasy): ----
- Military / Shooter Games (e.g., Halo, 007 James Bond): ----
- Puzzle Games (e.g., Tetris): ----
- Driving Games (e.g., Grand Theft Auto, Taxi, Top Gear, Mario Kart): ----
- Martial Arts Games (e.g., Street Fighter, Mortal Combat): ----
- Total: ----

APPENDIX B

Pedestrian Safety Questionnaire

The purpose of this study is to examine pedestrian safety. Your responses to the following questions will remain anonymous and confidential. Your participation is voluntary; you are free to withdraw at any time. By doing this survey, you acknowledge that you have agreed to participate and are at least 18 years of age. If you have any questions or concerns, please contact the Reasoning and Memory Lab at ramlab@unlv.edu.

1- Sex:

- Male
- Female

2- Age: ----

3- Do you drive?

- Yes
- No

4- Where do you reside?

- Las Vegas
- Henderson
- Boulder City
- Other

5- How would you rate the effectiveness of the crosswalks (e.g., stop signals for people) in Nevada?

- very ineffective
- ineffective
- neither ineffective nor effective
- effective
- very effective

6- How would you rate how attentive drivers are when pedestrians cross the street?

- very inattentive
- inattentive
- neither inattentive nor attentive
- attentive
- very attentive

7- How safe do you feel when crossing the crosswalk?

- very unsafe
- unsafe
- neither unsafe nor safe
- safe
- very safe

8- How respectful do you feel drivers are to pedestrians when crossing the street?

- very disrespectful
- disrespectful
- neither disrespectful nor respectful
- respectful
- very respectful

9- How respectful do you feel pedestrians are to drivers on the streets?

- very disrespectful
- disrespectful
- neither disrespectful nor respectful
- respectful
- very respectful

10- How often do you jaywalk (i.e., crossing the street in a non-designated crosswalk)?

- Never
- Rarely
- Sometimes
- Usually
- Always

11- Do you feel that the pedestrian crossings need to be improved in Nevada?

- Strongly Disagree
- Disagree
- Neither Disagree nor Agree
- Agree
- Strongly Agree

12- Do you feel that there should be a stricter law / penalty for drivers passing the crosswalk when the pedestrians have the right of way?

- Strongly Disagree
- Disagree
- Neither Disagree nor Agree
- Agree
- Strongly Agree

13- Do you feel that there should be a stricter law / penalty for pedestrians who do not follow the rules of crossing in designated crosswalks (e.g., jaywalking)?

- Strongly Disagree
- Disagree
- Neither Disagree nor Agree
- Agree
- Strongly Agree

APPENDIX C

Design of Web-based and Interactive Driving Education Tool

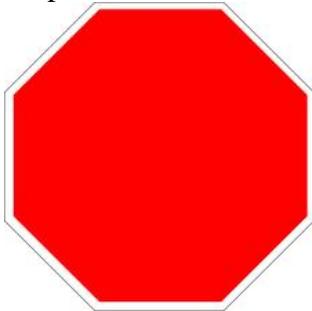
This appendix provides various design considerations for the implementation of the proposed web-based and interactive driving education tool. Appendix D provides screen shots of a prototype implementation for this design.

Matching Game

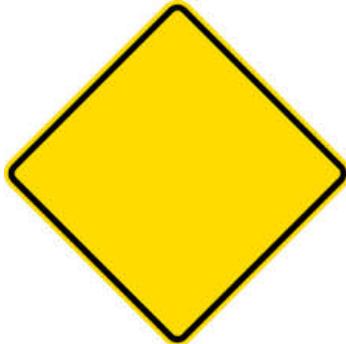
The purpose of this exercise is to test how well students know their traffic signals. There will be a list of labels, in which they must click and drag into their respective signs. The signs will be placed in random order each time the student answers one of the matches incorrectly.

Standard Shapes:

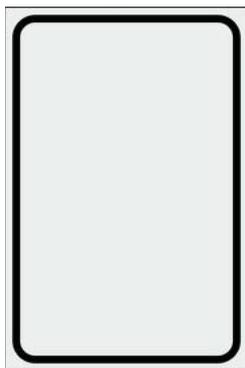
Stop



Warning



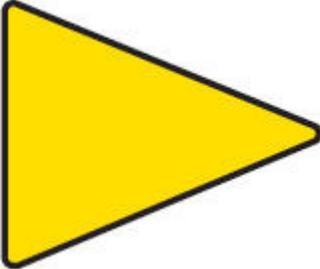
Traffic Regulations



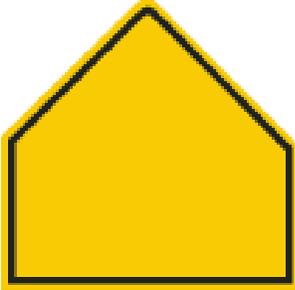
Yield



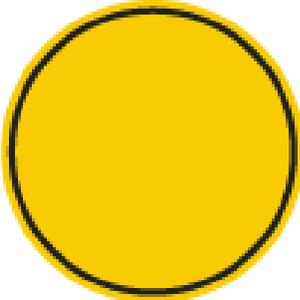
No Passing



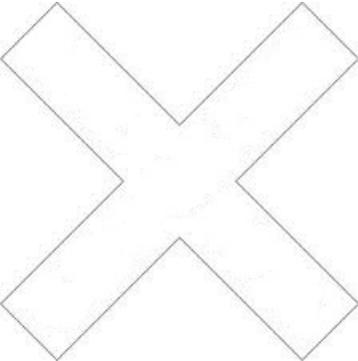
School Zone



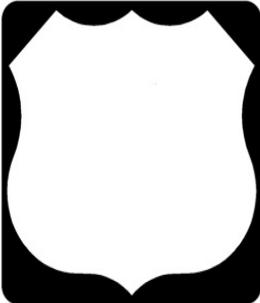
Railroad



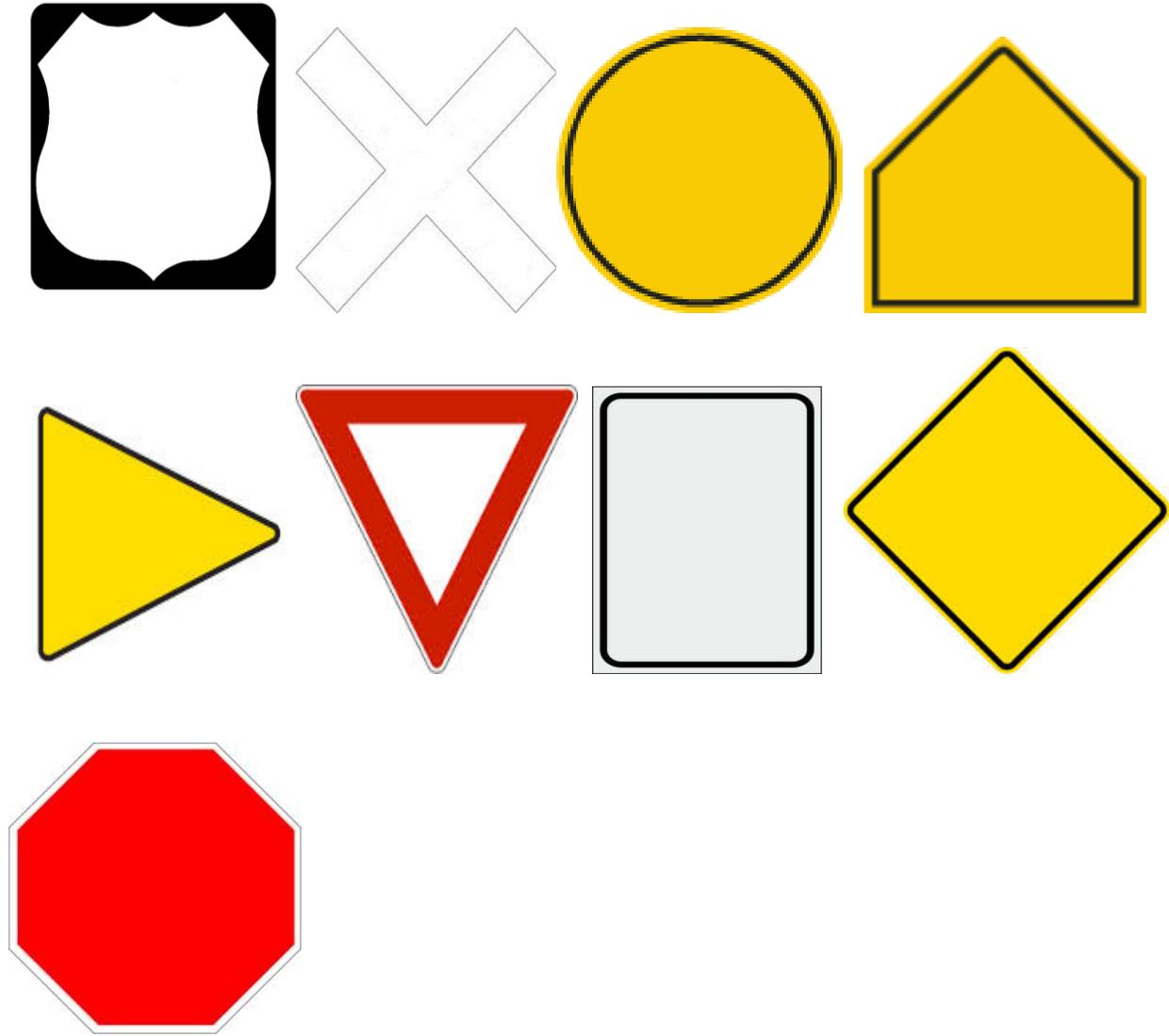
Railroad Crossing



Route Marker



Signs are randomized when one of the labels is matched incorrectly.



LABELS:
ROUTE MARKER RAILROAD CROSSING RAILROAD SCHOOL ZONE STOP
NO PASSING TRAFFIC REGULATION WARNING YIELD

Stopping Distance and Time

The purpose of this exercise is to give students a better understanding of how long it takes people to stop when they press their brake based on mph and distance.

The screen will show someone driving on the street. An object (e.g., a pet, child, bicycle, etc.) will appear in front of the screen, and the student must click on the mouse to stop.

On the screen, the student is given different scenarios. For example, he or she is told that the driver is driving at 25 mph. An object appears in the distance, and the student must click on the screen as fast as he or she can to press on the brake. After they have clicked on the mouse, information will record how fast they clicked, their perception and reaction distance (in feet), and the braking distance (in feet).

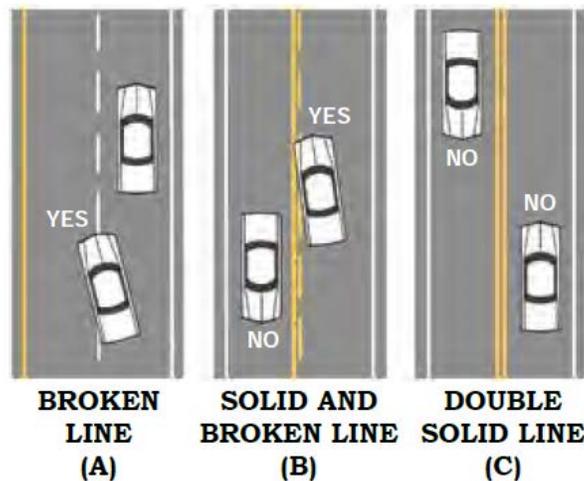
Perception and Reaction Distance (in feet) = the distance it takes the person to notice an object and to press the brake

Braking Distance (in feet) = the distance it takes after someone presses the brake for the vehicle to finally stop

Passing Lines

The purpose of this exercise is to give students a better understanding of the different kinds of center lines and how they relate to the rules for passing another vehicle.

The screen will show an overhead view of a two-lane street (as shown below). There will be two cars in the right-hand lane; in the front is the computer car (in white), behind that is the student's car (in some color). Above the display, there will be two buttons marked "YES" and "NO." The student clicks the button which corresponds to his/her answer as to whether it is legal to pass the computer car.



The student will be given one of the following scenarios:

1. Broken white line. Correct answer: yes.
2. Broken yellow line. Correct answer: yes.
3. Solid white line. Correct answer: no.
4. Solid yellow line. Correct answer: no.
5. Double yellow line, dashed on the driver's side. Correct answer: yes.
6. Double yellow line, dashed on the opposing side. Correct answer: no.
7. Double yellow line, solid. Correct answer: no.

When the correct answer is yes and the student selects yes, an animation will display the student's car moving into the left-hand lane and passing the computer car. The animation will finish with a green checkmark signifying they have chosen correctly.

When the correct answer is yes and the student selects no, a red X will flash on the screen signifying they have chosen incorrectly.

When the correct answer is no and the student selects no, a green checkmark will appear signifying they have chosen correctly.

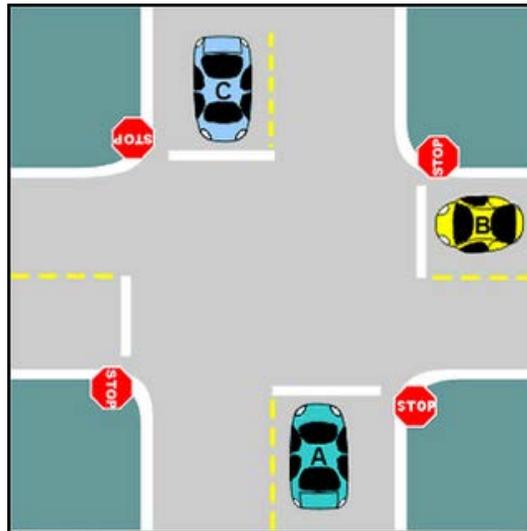
When the correct answer is no and the student selects yes, an animation will display the student's car moving towards the left-hand lane. When the front of the car breaks the plane of the line, the animation will stop, and a red X will flash on the screen signifying they have chosen incorrectly.

Whenever students make an incorrect choice, the correct choice will be displayed, followed by a dialog box which contains an explanation of the correct answer (e.g. "You may not pass if the lines on your side of the street are solid.").

Right-of-Way

The purpose of this exercise is to familiarize students with the right-of-way rules in Nevada.

The screen will show an overhead view of a four-way intersection (as shown below). Depending on the scenario, cars will approach from one or more of the four directions and come to a stop at the intersection. Each car will be marked with a letter to distinguish them from each other. Once all cars have reached the intersection, the student will click on the cars in the order in which they believe the cars should proceed. Some cars will display turn signals.



The number of cars and the timing of their arrival will vary for each scenario, but the correct order is determined by the following rules:

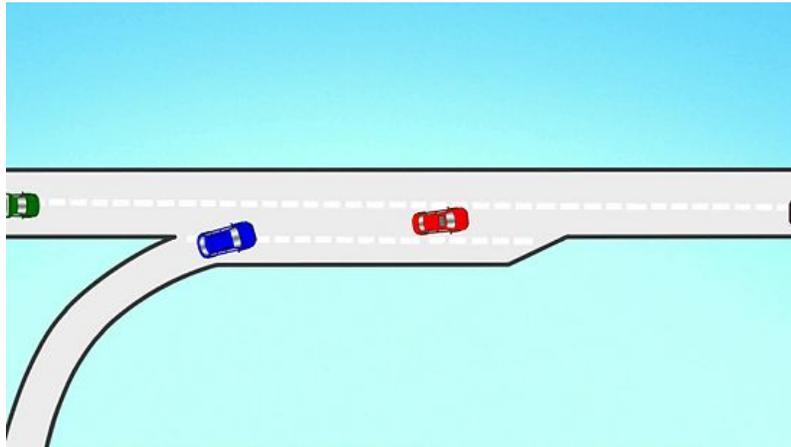
1. The vehicle on your right should go first (e.g. in the example above, the correct order would be C, B, A.)
2. A vehicle already at the intersection has right-of-way over other vehicles just getting there.
3. A vehicle going straight has the right-of-way over a vehicle turning left.
4. The driver reaching the intersection first gets to go first.

As students click on each car, it will proceed through the intersection (or make a turn if its turn signal is blinking). When the students select the wrong car in the order, the animation will stop as the vehicle reaches the middle of the intersection, and a red X will flash on the screen. A dialog box will appear which explains why that particular car did not have right-of-way, according to whichever of the previous 4 rules was violated.

Merging

The purpose of this exercise is to familiarize students with the proper steps for merging onto a freeway, as well as allowing other cars to merge.

The screen will display an overhead view of a two-lane freeway with a merging lane coming into the right lane (as shown below). Various computer cars will be moving across the two lanes at different speeds. The student's car will be represented by some unique color or other identifying feature. Students will use the up arrow on the keyboard to accelerate and the down arrow on the keyboard to brake.



Students will take part in one of two scenarios:

1. The student's car will start at the beginning of the merging lane. They will have to use the up and down arrow keys in order to control their speed and properly merge into a natural opening in the flow of traffic.
 - a. If students merge correctly, a green checkmark will appear signifying they have completed the scenario correctly.
 - b. If students reach the end of the merging lane without merging into traffic, a red X will flash signifying they have failed the scenario.
 - c. If the student's car comes into contact with one of the computer cars while merging, a red X will flash on the screen signifying they have failed the scenario.
2. The student's car will start at the beginning of the right-hand lane on the freeway. A computer car will move down the merging lane at a set speed. The students will have to use the up and down arrow keys in order to control their speed to either get ahead of or behind the merging car, depending on their speed.
 - a. If the students adjust their speed correctly, the computer car will merge onto the freeway, and a green checkmark will appear.
 - b. If the student's car comes into contact with the computer car, a red X will flash on the screen signifying they have failed the scenario.

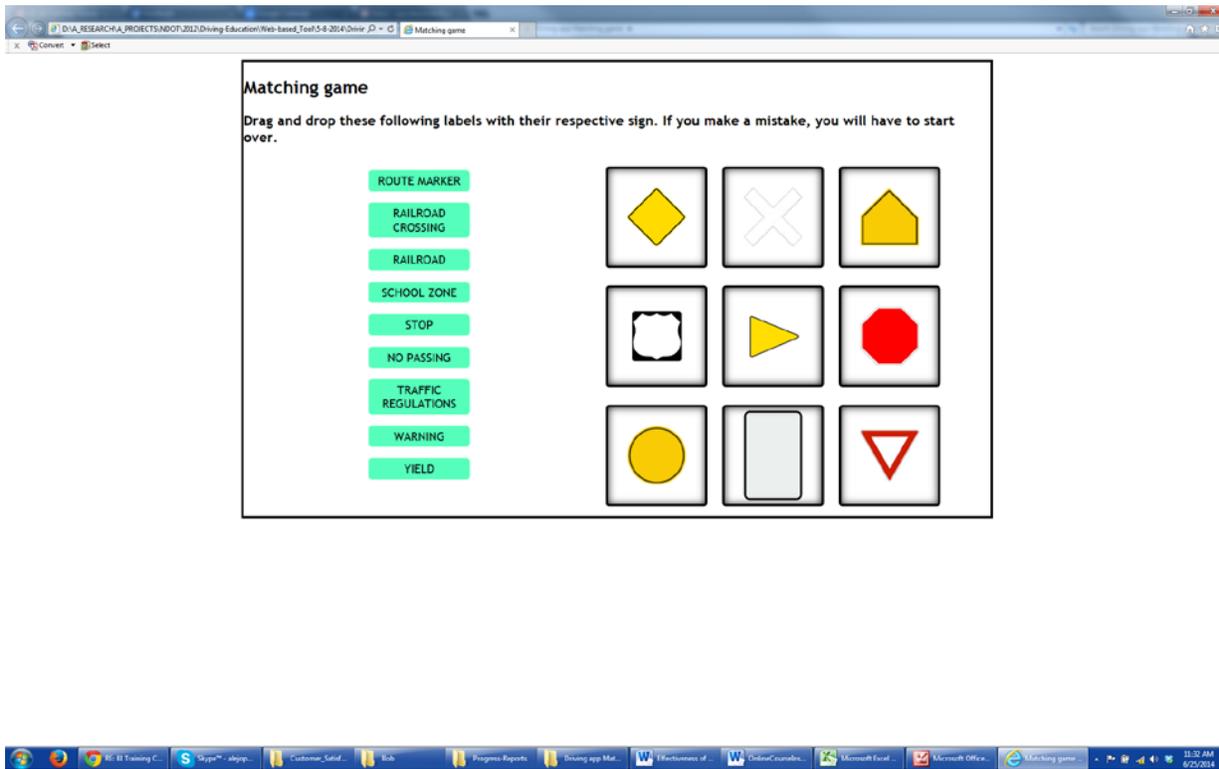
These two scenarios may be repeated more than once by varying A) the amount of computer cars on the freeway and/or B) the speed of the computer cars on the freeway or the computer car merging in the second scenario.

APPENDIX D

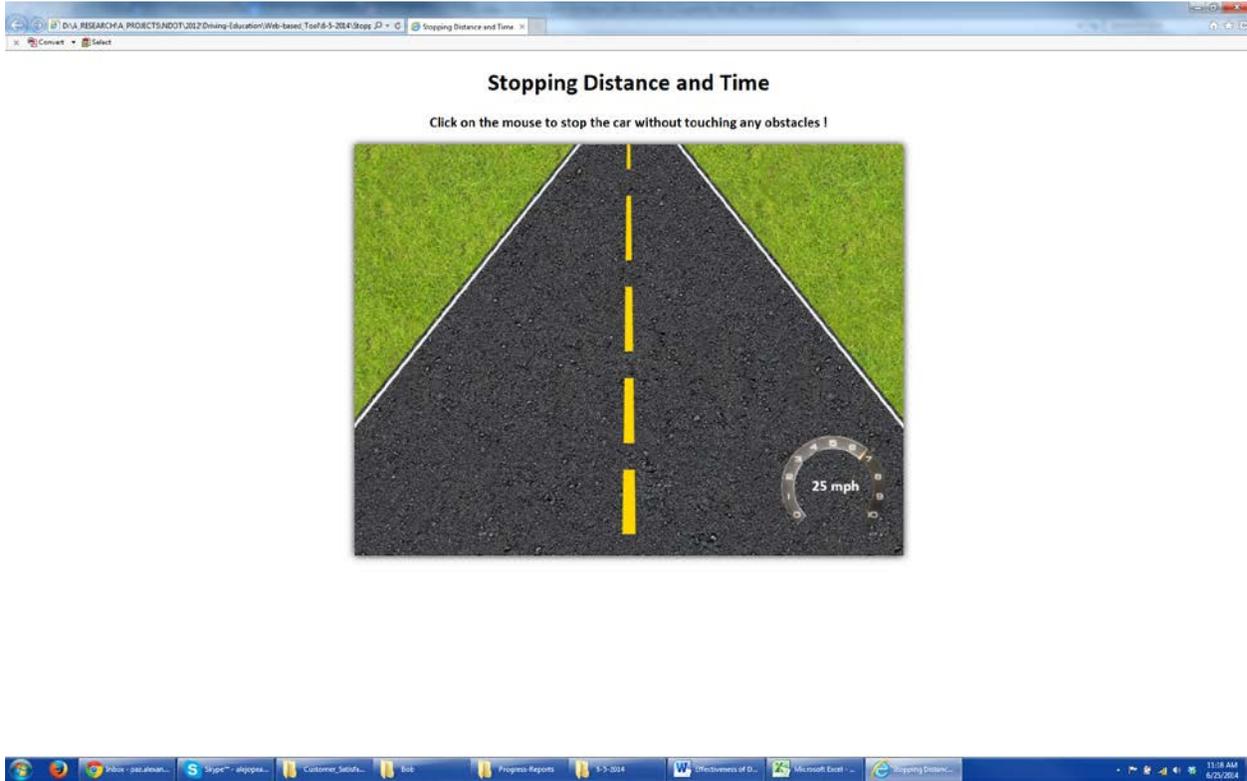
Prototype of Web-based and Interactive Driving Education Tool

This appendix provides screen shots of a prototype implementation for this design.

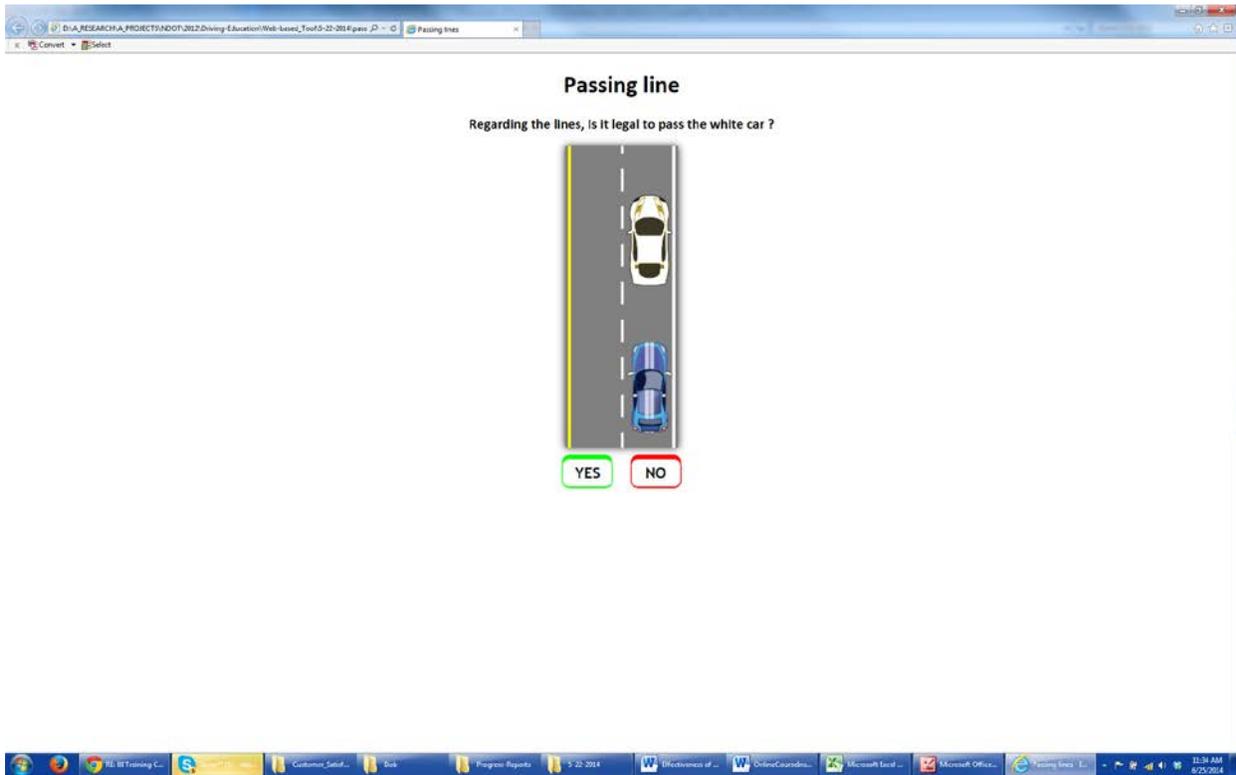
Matching Game



Stopping Distance and Time



Passing Lines





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