requiring answers on who has to give way, and to be quickly able to make the correct decisions. The safety advantage here is, if the wrong decision is made, there is an experienced instructor in each car who can quickly intervene.

Approximately 800 students per year, from the West half of Victoria and Southern New South Wales, attend the program, usually year 10 level, as they are generally 15 or 16 years old. Programs operate normally for 2 or 3 days, but are tailored to whatever the school desires. A night drive is normally included in the program.

Students are taught the very basics of how to drive a vehicle in a safe and predictable manner. They are taught how to drive "systematically" (a set order of doing things), and how to develop "good observation" so they are then in a position to take evasive action if needed. Good observation is constantly stressed as the most important thing: observation will keep you alive.

The Charlton Driver Education Centre tries to give these 15 – 16 year olds a "solid foundation" on which to build the rest of their driving experiences,

Delivering Results through Quality Driver Training

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Overview

The aim of this document is to provide a general overview on the issue of road safety and driver education. It looks at the road toll as it stands currently and reviews some of the previous research into driver training. In additional it looks at some new areas of research and how a hierarchy for Road Safety Training can be applied to training initiatives and driver education programs.

Introduction

It is well understood that road safety is a complex issue. The impact of road trauma places huge social and economic costs to communities across the globe. The World Health Organisation states that over 1.2 million people are killed each year as a result of road crashes [1] and for every death more than 10 people on average are seriously injured. Road crash fatalities in Australia peaked in 1970 with 3798 killed [2]. Since then the road toll figures have steadily decreased due to a number of initiatives and interventions. These included improved occupant safety, vehicle design rules and enforcement.

However it appears that the national road toll rate has now largely plateaued in recent years. The annual road toll figure in Australia has remained relatively constant at round 1600 people per year. Interestingly, whilst the number of fatalities has decreased overall the number of serious injuries is increasing. This simply means that the improvement in crash survival rates does not reflect a down turn in the crash rates themselves.

Governments, police and road authorities have consistently expressed a concern that current road safety activities have also levelled out. In fact there is evidence to suggest that the road toll figures may again start to increase unless new initiatives can be put in place. The World Report suggests that road fatality rates are forecast to increase by 65% by 2020.

Key Factors for Driving Improvement in Road Safety

Thanks to an enormous amount of ongoing development from key stakeholders driving today is the safest it's ever been. Over the past few decades there has been a significant amount of improvement in road design, enforcement vehicle safety and engineering. Yet despite all these advancements it is clear that a critical piece of the puzzle is still missing because the deaths and injuries from road crashes continue.

By comparison, the only area that has not improved relates to a vehicles biological component ...The driver.

It could be argued that the driver training and licensing have largely remained unchanged whilst almost every other aspect of motoring has experienced significant levels of development and evolution. Driver licensing tends to focus on the fundamentals of vehicle control and the key elements of road law. Whilst these areas are important in early driver development there is little refinement in these base skills once the licence is issued. This can lead to drivers assuming that holding licence means that they have nothing more to learn.

It is also well known that the vast majority of people overestimate their abilities and believe that they have above average driving skills [3]. However, crash data reveals that up to 95% of all road crashes are the result of human error. Logic suggests that if you improve the capabilities of the driver you will improve safety. However, as driving is such a complex task it is important to look at a holistic approach to enhancing overall driver abilities and behaviour. Driver Training offers significant opportunities to reduce road trauma yet in the past it is largely overlooked by academics and authorities as an effective countermeasure.

Previous Research into Driver Training

Many road safety academics have dismissed driver training often stating that it offers little value in the overall road safety strategy. The research literature outlines numerous studies stating that driver training programs are generally ineffective and may also have an adverse impact on road safety [4]. Yet further investigation of the available literature reveals a number of issues regarding the research methodology and the understanding of the issue itself. Therefore it draws into question the results and outcomes from these previous studies.

Definition of Driver Training

One of the first issues is that the literature doesn't clearly define what driver training is and, as a result, there is an assumption that all driver training programs are the same [5]. In fact there have been relatively few studies into post-licence driver training programs. It is inappropriate to use the term "driver training" generically because the design, content and course structure varies from provider to provider. The results of one study may not necessarily accurately reflect the whole industry. In addition many reviews have had too wide a scope and included remedial programs that are meant to deal with specific behavioural issues such as persistent drink drivers.

Structure of the Program

Another key issue relates to the quality of the training provided. Typically the type of training being criticised was short in duration, focused solely on vehicle operation skills and used scare tactics to invoke safe driving [5, 6]. In some cases, the only training a student received was a brief demonstration of a particular driving situation. Whilst this may help to increase an awareness of the situation it does not provide an effective means of training.

A sound training program does need to offer a balance in the curriculum to address the issues holistically rather than dealing with isolated examples with little or no detail on correct actions and perceptions. It also needs to be relevant in the daily on road context. Therefore, such reviews are problematic, biased and controversial, especially as the discussions and conclusions are generalised to general post-licence programs. [5].

A New Direction for Road Safety

Recently, some academics have begun to re-evaluate these issues within the overall context of road safety. Researchers such as Watson [7] have proposed a selection of research priorities for the future development of driver training models. These new priorities will assist in identifying research opportunities for a range of new studies into a higher order of driver training. These would include promoting skill development, hazard detection, situational awareness, attitude, perception and bio-mechanics. More importantly these studies would need to assess the cumulative effect of each of these areas and how they affect driving as a whole. An effective driver training program needs to integrate a number of key elements of scientific knowledge and embrace the following aspects.

1. A Hierarchy for Road Safety Training

There has already been some sound research into this cumulative approach and how it is applied to educational methods [8]. Hatakka et al [8] have looked at identifying a conceptual model of driver training. They have identified a hierarchical approach to the driving task. This approach is based on a solid theoretical framework that covers the task of driving as broadly as possible.

"Although in the past hierarchical approaches have been used mainly for describing the performance aspects of driving behaviour, a hierarchical approach can also be used to combine the motivational and attitudinal aspects of driving behaviour with performance, or operations in certain traffic situations." [8]
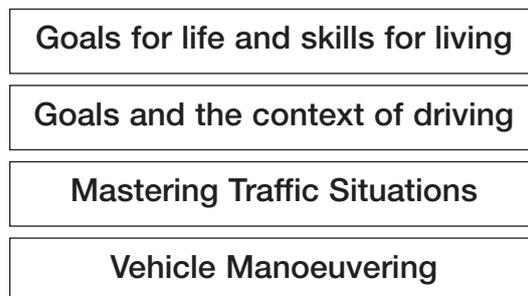
Goals for life and skills for living
Goals and the context of driving
Mastering Traffic Situations
Vehicle Manoeuvering

Illustration of hierarchical levels of driver behaviour (adapted from Keskinsen, 1996)

The core philosophy in a hierarchical approach is that all these aspects are directly linked as one system. Results at the lower levels will also manifest in the higher levels as well.

This is critical to the overall effectiveness of the training program. It must address this hierarchy across the driving task. This includes both the physical and psychological aspects.

2. Insight Training

"Intelligent measures toward educating the public to drive safely can only be taken when the performance of driving an automobile is thoroughly understood." [9]

This area is critical. In order to be effective driver training needs to combine three key aspects.

These are: **Physical technique; Correct Attitudes; and Commonsense**

Only when all three aspects are present do we have a strong foundation for safety.

3. Visual Performance

Visual performance and information intake are critical for safe driving. Errors in perception and recognition have been reported as the most pervasive cause of road accidents involving normal, sober drivers [10]. Drivers in general have little insight into how to correctly use their visual capability to enhance scanning patterns and avoid eye fixation. Research has repeatedly demonstrated that a driver's skill at scanning for visual information and hazards detection improves with training [11].

4. Focus on Driver Bio-Mechanics and Ergonomics

Driving a vehicle is recognised as a complex perceptual-motor task. Postural stability relates to techniques that will assist the driver in achieving a stable orientation within the cockpit environment. A stable posture optimises driver performance and improves vehicle control by effectively coupling the driver and the vehicle. It offsets the external forces that act on the driver once the car is in motion. Without this postural support a driver will attempt to stabilise themselves by increasing grip on the steering wheel. Treffner [12] regards this as an inappropriate means of postural support and that it reduces the driver's ability to effectively control the vehicle. It can also contribute to an increase in driver fatigue and a reduction in concentration.

Stoffregen et al [13] also investigated the relationship between visual performance and postural control. The results from their research supported the hypothesis that postural control is not an autonomous system, but is organised as part of an integrated perception/action system. Postural control can be used to improve visual performance. Importantly, postural stability should not be considered in isolation, but rather as an essential component of a complete driving style.

Recent studies by Treffner et al [12] have been undertaken to focus on this issue and how it relates to improving driver performance specifically. The studies looked at how the integration of driver posture affected driver performance in a range of driving tasks. It also addressed how these improvements would enhance overall vehicle control and vehicle stability.

In addition the studies highlighted that driver training programs based upon the development perceptual-motor skills through enhanced postural stability demonstrated positive effects on vehicle motion.

Conclusions

This paper was structured to provide a general overview on the road safety issue and outline the current research relating to driver training. It highlighted that whilst there have been numerous studies into driver training few have looked at the post-licence area in any detail. Many past studies have also had significant questions raised about the methods and findings. Therefore the results may limit the development of future training programs. What is clear is that many academics have ruled driver training in the past as an ineffective means of reducing road trauma. However there are new studies that support driver training, especially as it relates to bio-mechanics, visual performance and vehicle control.

The challenge for future studies will be to collect long term research data on these higher order skills and the potential benefits on overall crash reduction. In order to achieve the ambitious road safety targets set by the authorities, focus must be placed on introducing new countermeasures. This must include how drivers are trained and how we develop driving abilities beyond the initial licensing phase.

Quality driver training and education has a critical role to play in our overall approach to reducing road trauma. However the training structure must reflect the key elements from these higher order skills as they apply to motoring safety. They are part of a holistic approach that includes driver behaviour, understanding the full field of driving dynamics and appropriate attitudes towards driver safety.

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The Graduated Driver Licensing System in New South Wales

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Abstract

This paper reviews the graduated driver licensing system used in New South Wales to regulate the entry of novice drivers into the driver licensing system, and compares the Australian approaches to graduated driver licensing with systems in use in North America and elsewhere. It is proposed that the Australian approaches, as exemplified by the New South Wales graduated driver licensing systems, is a blue ribbon system demonstrating best practice.

Introduction

The entry into the driver licensing system in New South Wales (described as a graduated driver licensing system) might well be considered a blue ribbon model for such systems in the management of new drivers. This paper provides a brief review of the nature of graduated driver licensing systems for novice drivers in Australia, with a particular focus on the New South Wales system. It is a summary of invited presentations on systems to improve young driver safety made to the US Transportation Research Board Committee on Alcohol, Other Drugs and Transportation Safety in June 2008 [1] and January 2009 [2].

The Australian approach to graduated driver licensing systems

Graduated driver licensing systems were introduced in Australian jurisdictions from the mid 1960s, and there is thus more than four decades of experience with different forms of this licensing approach. A rudimentary graduated driver licensing system was legislated in New South Wales in 1965 and commenced in 1966. It is useful to examine the features of this basic system. The graduated driver licensing system required novice drivers to complete a period of provisional licensing where several restrictive conditions were imposed (a learner drivers licence had been a requirement for novice drivers since the late 1940s):

- Compulsory carriage of drivers licence (applicable to all New South Wales drivers);

- Minimum age for obtaining a learner drivers licence of 16 years 9 months;

- Knowledge test of road rules before issuing a learner drivers licence;

- Three months tenure of learner drivers licence;

- 40 mph maximum speed limit for learner drivers;

- Requirement to display an L plate on the front and rear of the vehicle to indicate licence status of driver;

- Must be accompanied by a supervising driver in the front passenger seat who is fully licensed;

- On road test by a government (Department of Motor Transport) driving examiner before issue of a provisional drivers licence;

- 12 month period of provisional licensure;

- Requirement to display a P plate on the front and rear of the vehicle to indicate licence status of driver; and

- 40 mph maximum speed limit for provisional drivers.