ASSESSING APPROACHES TO CHANGING ROAD SAFETY BEHAVIOURS OF COMMERCIAL DRIVERS IN HO MUNICIPALITY, GHANA.

BY

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THIS THESIS IS SUBMITTED TO THE UNIVERSITY OF GHANA, LEGON IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE AWARD OF MPHIL ADULT EDUCATION DEGREE.

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DECLARATION

I hereby declared that except for references to other people's work which have been duly cited, this work is the result of my own original research carried out in the 2011/2012 academic year. This work has neither in whole nor in part been presented to any other institution for award of degree.

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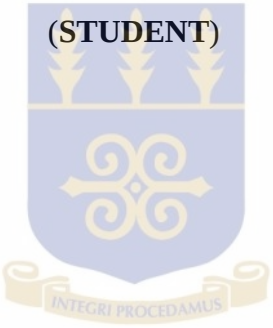

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DEDICATION

This work is dedicated to my parents whose toil, dedication and immense efforts have laid the foundation of my life and education.

I also dedicated this work to my lovely wife Patience and children, Yaa, Makafui and Etornam for their patience and endurance for my long stay of absence.

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The final responsibility for any errors and inaccuracies in this work, however, is solely mine.

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LIST OF ABBREVIATIONS

BAC	-	Blood Alcohol Concentration
CO-OP	-	Cooperative Transport Union
DE	-	Driver Education
DWI	-	Driving While Intoxicated
DVLA	-	Driver and Vehicle Licensing Authority
FGD	-	Focus Group Discussion
GAO	-	General Accounting Office
GDP	-	Gross Domestic Product
GPRTU	-	Ghana Private Road Transport Unit
GNP	-	Gross National Product
HMC	-	High Motorized Country
LMC	-	Low Motorized Country
MAC	-	Motor Accident Cases
MMT	-	Metro Mass Transit
MTTU	-	Motor Traffic and Transport Unit
NHTSA	-	National Highway Traffic Safety Administration
NRSC	-	National Road Safety Commission
NSC	-	National Safety Council
OECD	-	Organization for Economic Cooperation and Development
RBT	-	Random Breath Test
RHT	-	Risk Homeostasis Theory
RTI	-	Road Traffic Injury
SPSS	-	Statistical Package for Social Sciences
UNECE	-	United Nations Economic Commission for Europe
WHO	-	World Health Organization

ABSTRACT

Ghana has considerable problems with road safety which manifest in the numerous incidences of road accidents. In the past, road safety management was characterized by dispersed, uncoordinated, and insufficiently resourced institutional units performing isolated single functions by individual departments within the Ministry of Roads and Transport. Currently, the National Road Safety Commission (NRSC), Police MTTU and DVLA together with other stakeholder organizations were mandated to address the incidence of unacceptably high levels of road traffic crashes in the country by enforcing and regulating road traffic rules and regulations. Yet, due to the ever-increasing vehicular fleet in the country, the notoriously bad attitude of road users and the weak enforcement of traffic rules, the absolute number of deaths and injuries still fluctuate within unacceptable ranges. Additionally, there appeared to be legislative, institutional, administrative and procedural inadequacies which were also aggravated by problems of inadequate logistics and funding for road safety activities. The study, therefore sought to assess the effectiveness of the approaches used to change road safety behaviour among commercial drivers in Ho Municipality.

In all, a sample of 103 respondents was used for the study. The research used the descriptive analytic survey design. An interview schedule, focus group discussion, in-depth interview, observation and document review were the main data gathering instruments used in collecting data. Face-to-face interviews were conducted on 78 commercial drivers who were simple randomly sampled. Two focus group discussions were held for 8 commercial drivers and 6 driver union leaders. In-depth interviews were held with one regional head and some frontline staffs of the police MTTU, DVLA and the NRSC who were purposively sampled. Observation

method was also used together with the in-depth interview to collect data from the DVLA. Document review was used to collect information on road safety legislation.

The results of the study revealed that the commercial drivers met the stipulated minimum educational requirement but their educational levels were low. Learning by apprenticeship was the main mode of training for commercial drivers and some drivers still obtained and renewed their licenses and road use certificates through agents. The commercial drivers had poor knowledge on road traffic rules and regulations, but they perceived the police MTTU and the DVLA to be effective in regulating road traffic rules. The majority of the commercial drivers have not had any incentive or reward and most of them have not attended any driver education or training since they started driving.

Ghana has a comprehensive legislation on road safety; the police MTTU enforced road traffic rules; the DVLA ensured best practices of licensing drivers and vehicles and the NRSC provided leadership in the development and implementation of measures that will reduce road traffic accident fatalities. Some challenges faced by commercial drivers included bad nature of the roads, poor signing and markings and numerous speed humps; and the commercial drivers do not have professional education and training opportunities.

Legislation on road safety spelt out the condition under which a person would be said to have committed a road traffic offence. The police MTTU ensured safety on the roads through road checks to ensure compliance with road safety rules and regulations and the provision of road safety education. The DVLA regulated drivers and enforced road traffic rules and regulations. Reinforcement of drivers included incentives and rewards and the NRSC undertook nationwide

planning, development and implementation of road safety programmes and activities and road safety education.

Some of the challenges faced by the approaches to change driver behaviour included outdated road safety regulations; lack of adherence to most of the existing Acts, regulations and by-laws; and absence of a regulatory authority. The Police MTTU, DVLA and NRSC were challenged by limited logistics and personnel to carry out effective enforcement, regulation and education on road safety. There was political interference in the operations of the police MTTU, DVLA and NRSC in the discharge of their duties.

Based on the findings of the study the following recommendations were made:

- Encouraging cooperation between driving schools and the informal driver training systems in the training of learner drivers may be beneficial in increasing the quality of instruction and the breadth and depth of learner driver experience.
- Driver education and training programmes should be included in the Transport Unions' and companies' planning process so that the necessary funding and other resources are made available to enable drivers to access timely and appropriate training.
- There should be periodic review of Road Traffic Act and regulations since some of the road traffic laws were based on assumptions about outdated automotive technology and have not been reviewed as technology improved.
- Driving incentive programmes can be used to motivate commercial drivers to improve their performance.
- The capacity and resources of the police MTTU, DVLA and NRSC should be improved sufficiently to ensure effective and efficient enforcement and regulation of road traffic rules.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Road traffic safety refers to methods and measures for reducing the risk of a person using the road network being killed or seriously injured. The users of a road include pedestrians, cyclists, motorists, their passengers, and passengers of on-road public transport, mainly buses. Best-practice road safety strategies focus upon the prevention of serious injury and death crashes in spite of human fallibility (International Transport Forum, 2008). The World Medical Association (2006) stated that serious injuries and mortality in road collisions are a public health problem with consequences similar to those of major diseases such as cancer and cardiovascular disease.

World Health Organization (WHO, 2009) estimated that worldwide, about 1.3 million persons were killed on the roads and an additional 20 to 50 million were injured. They pointed out that, road crashes currently rank with tuberculosis and malaria as major killers in global terms and almost half of those who die in road crashes are pedestrians, cyclists and motorcyclists, collectively known as "vulnerable road users". Road traffic injuries were the 11th leading cause of death worldwide and accounted for 21 percent of all deaths globally; road traffic deaths accounted for 23 percent of all injury deaths worldwide; an overwhelming majority (90 percent) of the road traffic deaths occurred in low-income and middle-income countries, where 81 percent of the world's population live and own about 20 percent of the world's vehicles; the overall global increase in road traffic accident mortality was predicted to be 67 percent by 2020 if appropriate action is not taken. The United Nations' report entitled "World Report on Road Traffic Injury Prevention" noted that if action is not taken traffic collisions would become the

third major cause of death. The major victims of these traffic collisions were people between 5 and 44 years of age; and the cost of these collisions represented 2 to 3 percent of countries' Gross Domestic Products (Peden, Scurfield, Sleet, Mohan, Hyder, Jarawan & Mathers, 2004).

In Canada traffic collisions were the major causes of death for those aged 5 to 34 and the injuries sustained in collisions were a major burden on the healthcare system in terms of emergency treatment, chronic care, and rehabilitation (Ramage-Morin, 2008). India has the second largest road network in the world with over 3 million kilometers of roads. Over 40 million vehicles used the roads and these had a terrible toll on human life, killing over 80,000 people with over one-third of a million victims requiring hospital treatment. These crashes did not only cause considerable suffering and hardship, but they also had a major impact on the country's economy, costing an estimated Rs 300 billion or more than 3 percent of India's GDP every year (Global Road Safety Partnership, 2011). According to Kilbey (2011), the reported road casualties in Great Britain estimated that 1,910 people were killed and 24,560 were killed or seriously injured, in the second quarter in the year ending June 2011.

Mortality due to road traffic injuries (RTI) in Africa is among the highest in the world at 28.3 deaths per 100 000 population (Peden et al., 2004). The economic costs associated with RTIs in Africa according to Peden et al. were estimated to be US$3.7 billion in 2000, translating to approximately 1 to 2 percent of each country's gross national product. Africa's global road fatality share was three times as large (11 percent) as its motor vehicle share. The road fatality toll had grown by over a quarter in African countries like Nigeria, Kenya, Ethiopia, Tanzania, Malawi and Zambia over the past several years. One of the most important differences between High Motorized Countries (HMCs) and the Low Motorized Countries (LMCs) as explained by Peden et al. was that over the last ten years, whilst the number of deaths fell by about 10 percent

in HMCs, in Africa, Asia/Pacific and Latin America regions, road deaths kept increasing. According to Moira Winslow, Chairman of Drive Alive in South Africa cited in WHO (2004), the road traffic death toll represents only "a tip of the iceberg" of the total waste of human and societal resources from road injury. In South Africa, a total of 3,280,931 deaths were recorded between 2001 and 2006 of which 9.5 percent were due to non-natural causes and road traffic accident deaths comprised 9.3 percent of non-natural deaths. Analysis of the injury burden in South Africa by WHO (2004), showed that the age standardized road traffic injury mortality rates for South Africa were about double the global rate for both males and females. The WHO (2004), estimated that almost 16,000 people die from injuries sustained in road mishaps in Nigeria each year, and several thousands more end up with non-fatal injuries and permanent disabilities. As stated by the report, Nigeria has one of the highest road traffic accident rates in the world, and accidents and injuries were the major cause of death in adults under 50 years.

Statistics on road traffic crashes in Ghana indicated that on a daily basis, four people were reported killed and more than ten persons injured. On the average, 1,600 deaths and over 15,000 injuries were recorded annually as a result of road traffic accidents. These cost the nation 1.6 percent of its annual Gross National Product (GNP) (National Road Safety Commission's Annual Report, 2006). In 2009 the total number of crashes recorded in the country was 12,299 resulting in 2,237 fatalities and 16,259 people suffered injuries. In 2010 road traffic crashes recorded was 11,506 resulting in 1,986 fatalities and 14,918 people suffered injuries (National Road Safety Commission's Annual Report, 2010). In 2011, there were 13,572 recorded road crashes in which 2,330 people died and 13,272 people suffered injuries.

Over the years, the vehicle/population ratio in Ghana has been growing steadily from a vehicle/population ratio of around 31 vehicles per 1,000 population in 2002 to around 44

vehicles per 1,000 population in 2008. The increase in vehicle population in the period 2001 to 2010 was 61,427 as against 43,825 in the period 1991 to 2000, indicating approximately 41 percent increase in the annual rate of vehicle growth rate in the country. Just as the rate of vehicle/population has grown, so has the absolute fatality rates been rising. Within the 5 year period from 2006 to 2010, the number of people killed on Ghana's roads averaged around 2,012 annually. Specifically, in 2009, the number of people killed was 2,237 (NRSC's Annual Report, 2010). As reported by the Volta Regional Office of the NRSC (2010), the reported Motor Accident Cases (MAC) in Ho Municipality in 2008 and 2009 were as follows: the MAC reported was 187 cases in 2008 and 220 cases in 2009. Out of these, the number of persons killed was 36 in 2008 and 32 in 2009 and the numbers of persons injured were 148 in 2008 and 148 in 2009. A total of 171 people lost their lives and 898 others got injured in 736 road crashes in the Volta Region in 2011, with Ho, the regional capital recording the highest number of accidents which stood at 309. The statistics showed further that 178 motorbikes, 570 commercial and 314 private vehicles respectively were involved in those crashes. Most of the crashes as explained by Ho MTTU Police were due to driver negligence.

The road from Accra to Ho and from Ho to Aflao passes through Ho Municipality and many of such major roads in the Volta Region had human settlements and activities along them. Most of the roads are also narrow and unmarked and passes through quite highly populated areas which requires drivers to respect the speed limit on these roads to enable them to take control of unforeseen situations should they occur. The situation is made worse by drivers from the sister West African countries such as Togo, Benin and Nigeria who come to Ho Municipality and exhibit inappropriate driving practices that result in accident. In an attempt to address this situation, the locals erected unauthorized speed humps made of cement blocks, tree stumps and

heap of sand. Some even go to the extent of digging trenches on the tarred roads, destroying the roads in the process. The roads, thus, become very dangerous for all users in the Ho Municipality. Likewise, the use of motorbikes for commercial purposes in Ho Municipality has also added to the already unsafe use of the roads in the region.

In the past, road safety management in Ghana was characterized by dispersed, uncoordinated, and insufficiently resourced institutional units performing isolated single functions by individual departments within the Ministry of Roads and Transport: Ghana Highways Authority, Department of Urban Roads, Department of Feeder Roads, Driver Vehicle Licensing Authority, and the National Road Safety Committees.

Currently, the National Road Safety Commission (NRSC) has been established by an Act of Parliament (ACT 567, 1999) and mandated to plan, develop, promote and coordinate road safety activities in the country. Since 2001, the NRSC has been pursuing a coherent, consistent and comprehensive national road safety strategy in compliance with its mandate to address the incidence of unacceptably high levels of road traffic crashes in the country. Other public and private efforts have also helped manage in stabilizing or decreasing crash rates in Ghana. Yet due to the ever-increasing vehicular fleet in the country, the notoriously bad attitude of road users and the weak enforcement of traffic rules, the absolute number of deaths and injuries fluctuate within unacceptable ranges (NRSC's Annual Report, 2010).

Past road safety efforts addressed the environment of road safety, focusing on engineering, safer cars and highways. In recent years, the emphasis according to Lonero, Clinton, Wilde, Roach, McKnight, MacLean, Guastello & Lamble (2007), had shifted towards encouraging safer road user behaviour and the efforts to change road user behaviour focused on four practical approaches: legislation, enforcement, reinforcement and education. Lonero et al. (2007)

explained that legislation works in two ways: its declarative effect and deterrent effect. The declarative effect is dependent on education and communication whereas deterrence is dependent on enforcement. Enforcement they said upholds society's expectations and standards and imposes sanctions when laws are violated and it is the threat of these sanctions that persuades most road users to comply. Reinforcement according to Lonero et al. included incentives, rewards and other aspects of behaviour analysis techniques such as prompts and feedbacks and it focuses mainly on encouraging desirable behaviours rather than discouraging undesirable behaviors. Driver's education teaches traffic code or laws, vehicle operation and proper driving strategies and the consequences for not observing the rules. According to Mayhew and Simpson (2002), the main goal of driver education and training is to produce "safer" drivers, defined in terms of collision involvement.

1.2 Statement of the Problem

Ghana has considerable problems with road safety which manifest in the numerous incidences of road accidents. Additionally there are legislative, institutional, administrative and procedural inadequacies. The effects of these challenges are often aggravated by problems of inadequate logistics and funding for road safety activities. There is therefore the need for a review of the safety management capacity and the preparation of a long term investment strategies and related programmes and projects to overcome revealed capacity weaknesses.

The process of appraising current road safety performance involved multi-sectoral strategic examination of a range of activities from key government agencies such as Transport, Police, Education and Driver and Vehicle Licensing Authority as well as all stakeholders who are able to contribute to the delivery of road safety results. They produce the interventions to achieve the desired long and medium-term road safety results. Without effective institutional management,

Ghana has a little chance of implementing successful road safety interventions and achieving desired results.

The question therefore is: how effectively are the methods used to change road safety behaviour among commercial drivers in Ho Municipality?

1.3 Objectives of the Study

1.3.1 Overarching/Primary Objective

The primary objective is to explore and describe approaches to changing road safety behaviours of commercial drivers in Ho Municipality, Ghana.

1.3.2 Secondary Objectives

The secondary objectives of the study are to:

- Find out the demographic characteristics of commercial drivers in Ho Municipality;
- Analyze the following approaches used to change road safety behaviour of commercial drivers in Ho Municipality:
    - Legislation
    - Enforcement
    - Reinforcement
    - Education; and
- Find out the challenges faced in the application of these behaviour change approaches in Ho Municipality.

1.4 Related Questions

1.4.1 Overarching/Primary Question

What approaches exist to change road safety behaviours of commercial drivers in Ho Municipality?

1.4.2 Secondary Questions

- Are there legislations which regulate road safety behaviour? If yes, which ones?
- How effective are the legislation (if any) that regulate road safety behaviour?
- Does evidence suggests serious or laxity of the reinforcement of road safety rules and regulations?
- What impact does the current status of the reinforcement of road safety rules has on the behaviour of commercial drivers?
- How is road safety behaviours reinforced?
- What are some of the effects of different reinforcement on road safety?
- What are some of the skills or behaviors targeted by road safety education?
- What benefits are likely to accrue from road safety education, especially in terms of skills and behaviours of commercial drivers?

1.5 Significance of the Study

Road accidents are responsible for a considerable waste of scarce financial and human resources that are needed for the development of countries. In the case of Ghana, motorization and urbanization are growing faster than traffic legislation, institutions, education and infrastructure, which are needed to solve road safety problems. A prerequisite for improving road safety is information about accidents, fatalities, injuries, behaviours, vehicles and roads, to help assess the current situation and also give a good indication of its severity. Improving road safety and reducing fatalities and injuries due to accidents in Ho Municipality requires appropriate measures for the particular problems that exist in the Municipality. By using reliable data from the study,

the magnitude and nature of the different problems related to road safety in the Municipality can be identified and the necessary interventions put in place to solve the identified problems.

This study will also help to tackle the identified road safety problems that exist in Ho Municipality, since road safety is cultural specific. By identifying the problems with the vehicles, the institutions involved in road safety, the road infrastructure and risky road safety behaviors of commercial drivers, an effective road safety intervention such as raising public awareness, enhanced enforcement of traffic laws, increase communications, cooperation and collaboration among partners can be developed and implemented to prevent road traffic crashes, minimize injuries and their consequences in Ho Municipality. Road development is of high priority on the development agenda of the Government of Ghana because of the major role road transport plays in the movement of passengers and goods. Whilst embarking on the road development programme, Government need to attach equal importance to road safety, which is one of the requirements for the operation of an efficient and effective road transport system that should be addressed in tandem with the development of roads. This study therefore is in line with the Government's road safety policy and will help provide guideline for the design and implementation of national road safety programmes and activities in the country.

1.6 Operational Definition of Terms

The key words defined in the study are:

Road Safety – it refers to methods and measures for reducing or eliminating the risk of a person using the road network being killed or seriously injured.

Driver Behaviour – refers to what the driver chooses to do with his or her knowledge, skill, perceptual and cognitive attributes.

Road safety behaviour – the way people drive, cycle, or walk on the road is the most common source of road injuries and fatalities. The greatest potential for making our roads safer is influencing people to develop better perceptual, attitudinal, and psychomotor skills for these activities.

Commercial vehicle – is a type of motor vehicle that is used for transporting goods and passengers.

Commercial drivers – they are all individuals, whether paid or volunteer, who operate commercial motor vehicles.

1.7 Organization of the Study

The chapter one of this study constituted a general introduction; chapter two focused on the theoretical/conceptual framework and the review of the related literature; chapter three contained the methodology; chapter four detailed presentation and analysis of data on interview of commercial drivers; the aim and objectives of approaches used to change driver behaviour, how the approaches ensured safety and the challenges faced by the approaches in an effort to change driver behaviour; chapter five presented the discussion of research findings and chapter six offered the summary, conclusions and recommendations.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

The chapter presents the concepts and empirical literature that underlie the research. The concepts that underpin the research are Behavioral Science Theory, Theories and Models of Behaviour Change (Social Learning Theory, Social Cognitive Theory, Theory of Planned Behaviour and Transtheoretical Model) and Etzioni's Compliance Theory. The research also explored relevant empirical literature in support of the study and they included demographic factors of driving and efforts to change driver behaviour which were classified into the following sub-topics: legislation, enforcement, reinforcement and education.

2.2 Theoretical/Conceptual Framework

2.2.1 Behavioural Science Theory

Behaviour is a set of actions, the way we conduct ourselves and the things that we do. Science is a systematic knowledge of natural or physical phenomena, an organized way of thinking and an examination of how something works. Behavioural science is an organized way of understanding people's actions. It helps us to assess individual and community health risks, know with whom, when, where, and how to intervene to prevent risks and how to evaluate the effectiveness of our interventions (New York City Department of Health and Mental Hygiene Programme Evaluation Unit, 2002).

Behavioural science is important to road traffic accident prevention because knowledge about causes of road traffic accident alone is not sufficient for behaviour change to occur. Road traffic accidents occur mainly through behaviours that are linked to human error and risk-taking which occur in a social context. The use of behavioural science theories to road traffic accident

prevention can help frame a problem to help choose activities or interventions and meet the road users where they are. The practitioners use common language and it can demonstrate programme effectiveness and funders believe in it. To develop a successful intervention in road traffic accident prevention using behavioural science involve key components such as identification and knowledge of key target populations, identification of behavioural goals, identification of influencing factors, identification of appropriate strategy for affecting each influencing factor. Behavioural science theories according to New York City Department of Health and Mental Hygiene Programme Evaluation Unit (2002) focus on behaviour change, approaches behaviour from slightly different angles and focus on just a few behavioural factors or influences and successful interventions.

2.2.2 Theories and Models of Behaviour Change

Behaviour modification is the traditional term for the use of empirically demonstrated behaviour change techniques to increase or decrease the frequencies of behaviours through positive and negative reinforcement of adaptive behaviour and/or the reduction of behaviour through its extinction, punishment and/or satiation. Behaviour change theories and models are attempts to explain the reasons behind alterations in individuals' behavioural patterns. These theories cite environmental, personal, and behavioural characteristics as the major factors in behavioural determination. Behaviour change is often a goal for staff working directly with constituents, organizations, governments or communities. Individuals charged with this task can be thought of as "interventionists" whose goal is to design and implement programmes or interventions that produce the desired behavioural changes (Glanz, Lewis, & Rimers, 1990). As Glanz, Lewis, and Rimers' suggested, designing interventions to yield behaviour is best done with an understanding of behaviour change theories and an ability to use them in practice.

2.2.3 Learning and Behaviour Theories

From behaviourists such as B. F. Skinner come the learning theories, which states that complex behaviour is learned gradually through the modification of simpler behaviours (United States Department of Health and Human Services, USDHHS, 1996). Imitation and reinforcement play important roles in these theories, which states that individuals learn by duplication behaviours they observe in others and that rewards are essential to ensuring the repetition of desirable behaviour (Skinner, 1953). Learning theorists have demonstrated that behaviour can be changed by providing appropriate rewards, incentives, and/or disincentives. In learning or behaviourists approaches, these rewards and incentives are typically incorporated into structured reinforcement schedules, and the process of behaviour change is termed behaviour modification. While effective in bringing about behaviour change, such approaches require a high level of external control over both the physical and social environment, and the incentive (or disincentives) used to reinforce certain bahaviours and discourage others. This kind of control is hard to maintain in real life settings, and thus, strict behaviourist approaches are subject to a number of limitations.

2.2.4 Social Learning Theory

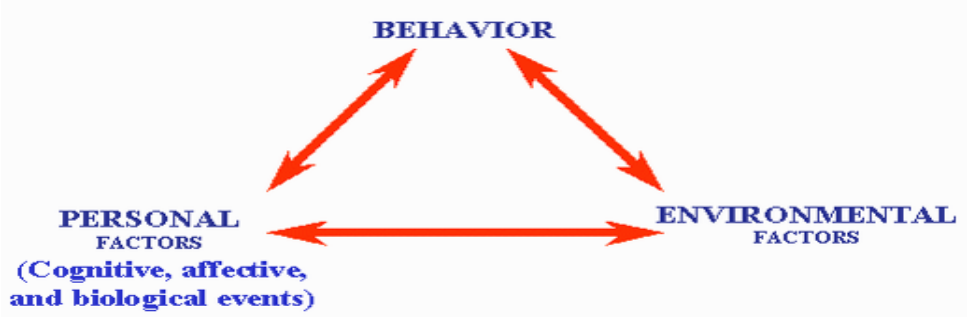
The social learning theory was proposed by Albert Bandura and while it was rooted in many of the basic concepts of traditional learning theory, Bandura (1986) believed that direct reinforcement could not account for all types of learning. His theory added a social element, arguing that people could learn new information and behaviours by watching other people. Social learning theory viewed the individual as an active participant in his or her behaviour, interpreting events and selecting courses of action based on past experience. Also known as observational learning (or modeling), this type of learning could be used to explain a wide variety of behaviours (Kendra, 2012). Kendra stated three core concepts of social learning

theory: the idea that people could learn through observation; the idea that internal mental states were essential part of this process; and the theory recognized that just because something has been learned, does not mean that it will result in a change in behaviour.

2.2.5 Social Cognitive Theory

Bandura's Social Cognitive Theory proposes that people are driven not by inner forces, but by external factors. This model suggests that human functioning can be explained by a triadic interaction of behaviour, personal and environmental factors (Bandura, 1986; Perry, Barnowski, & Parcel, 1990). It addresses both the psychological dynamics underlying behaviour and their methods for promoting behaviour change.

Figure 1: Conceptual Model of Social Cognitive Theory



Source: Pajares (2002).

This is often known as reciprocal determinism. Environmental factors represent situational influences and environment in which behaviour is performed while personal factors include instincts, drives, traits, and other individual motivational forces. Several constructs underlie the process of human learning and behaviour change (Bandura, 1986). These variables may also intervene in the process of behaviour change (Perry et al., 1990):

- *Self-efficacy* – a judgment of one's confidence in the ability to perform the behaviour and persist in behaviour. It was seen by Bandura (1986) as perhaps the single most important factor in promoting changes in behaviour. In general, higher levels of self-efficacy for a given activity are associated with higher participation in that activity;
- *Outcome Expectations* – a judgment of the likely consequences a behaviour will produce. The importance of these expectations (expectancies) may also drive behaviour;
- *Self-Control* – the ability of an individual to control their behaviours;
- *Reinforcement* – something that increases or decreases the likelihood a behaviour will continue;
- *Emotional Coping* – the ability of an individual to cope with emotional stimuli; and
- *Observational Learning* – the acquisition of behaviours by observing actions and outcomes of others' behaviour.

In applying this theory to the study:

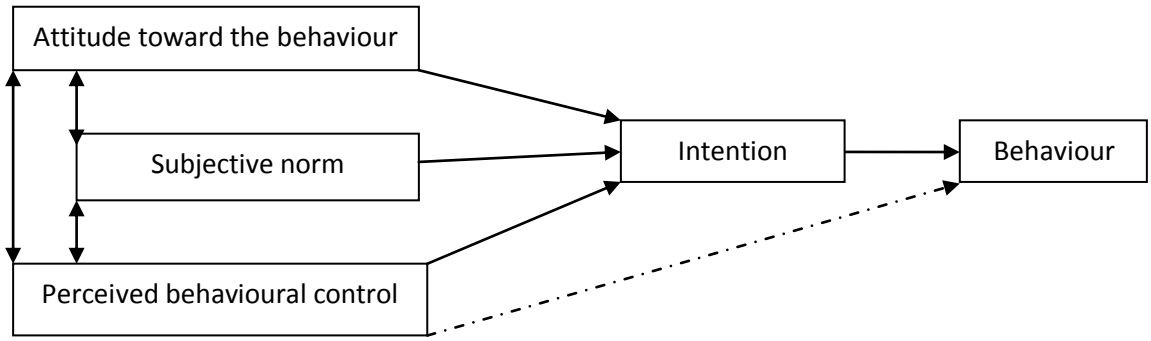
- To increase the levels of self-efficacy of commercial drivers, it is important for road safety practitioners to provide resources and support to raise individual confidence and also, behaviour change should be approached as a series of small steps;
- Even when individual commercial drivers have a strong sense of efficacy they may not perform the behaviour if they have no incentive. So if we are interested in getting others to enact behaviour change it may be important to provide incentives and rewards for the behaviours;
- Shaping the driving environment may encourage behaviour change. This may include providing opportunities for behaviour change, assisting with those changes, and offering

social support. It is important to recognize environmental constraints of commercial drivers that might deter behaviour change.

2.2.6 Theory of Planned Behaviour

Ajzen and his colleagues developed and refined a model focusing on intentions as the key link between attitudes and actual behaviour. The theory of planned behaviour suggested that behaviour is dependent on one's intention to perform the behaviour (Ajzen, 1991; Armitage & Conner, 2001; and Grizzell, 2007). Ajzen's theory of planned behaviour showed three separate but interacting determinants of one's intention (planned behaviour) to do something (actual behaviour).

Figure 2: Ajzen's Theory of Planned Behaviour



Source: Reprinted from Organizational Behaviour and Human Decision Processes. I. Ajzen. "The Theory of Planned Behaviour." 1991.

Ajzen (1991) explained the nature and roles of the three determinants of intention as follows:

- The attitude toward the behaviour referred to the degree to which a person has favourable or unfavourable evaluation or appraisal of the behaviour in question (beliefs and values about the outcome of the behaviour);

- Subjective norms or social factors referred to the perceived social pressure to perform or not to perform the behaviour (beliefs about what other people think the person should do); and

- Degree of perceived behaviour control referred to the perceived ease or difficulty of performing the behaviour and it was assumed to reflect past experience as well as anticipated impediments and obstacles (an individual's perceptions of their ability or feelings of self-efficacy to perform the behaviour).

This relationship is typically dependent on the type of relationship and the nature of the situation. This theory only predicts behaviour under the individual's control, not behaviour due to circumstances beyond one's control. This model can help predict the likelihood of commercial drivers putting up behaviours such as exceeding speed limit, driving under the influence of alcohol or drug, overloading, wrong overtaking, driving tired, mobile phone use while driving and failing to attend driver education and training to upgrade their knowledge and skills.

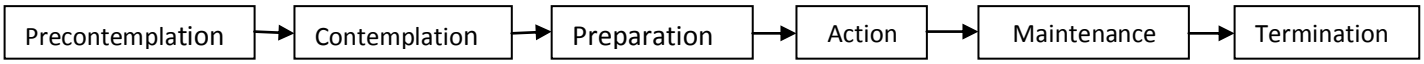
To bring the theory to the study, intention has been shown to be the most important variable in predicting behaviour change, suggesting that behaviours are often link with one's personal motivation (Godin & Kok, 1995), so to change commercial drivers' road safety behaviour, it may be important to present information to help shape positive attitudes towards the behaviour and stress subjective norms or opinions that support the behaviour. For perceived behavioural control to influence road safety behaviour change among commercial drivers, much like with self-efficacy, a driver must perceive that they have the ability to perform the behaviour and perceived control over opportunities, resources, and skills needed is an important part of the change process. From a practical management standpoint of the behavioural intention model,

road safety practitioners need to appreciate the dynamic relationships between attitudes, subjective norms and behavioural intentions when attempting to foster productive behaviour. Although attitudes are often resistant to change, they can be influenced indirectly through education and training experiences that change underlying beliefs.

2.2.7 Transtheoretical (Stages of Change) Model

Evidence suggests that behaviour change occurs in stages or steps, and that movement through these stages is neither unitary nor linear, but rather, cyclical, involving a pattern of adoption, maintenance, relapse, and readoption over time (Prochaska and DiClemente, 1986). The transtheoretical model proposes that behaviour change occurs as a process of six stages according to Prochaska, Johnson, and Lee (1998).

Figure 3: Stages of Change



Source: Prochaska, Johnson, & Lee (1998)

Pre-contemplation stage of change is the stage in which people are not intending to make a change in the near future (often defined as the next 6 months). Contemplation is the stage where people intend to change (within the next 6 months). People in this stage are aware of the pros of changing but also can identify the cons. Preparation represents the stage where people have a plan of action and intend to take action in the immediate future (within a month). Action is the stage in which people make the behaviour change and maintenance represents the stage where people work to prevent relapse. Finally, termination represents that stage where individuals have 100 percent efficacy and will maintain their behaviour. This stage is the most difficult to maintain, so many people remain a lifetime in maintenance.

In applying this theory to the study, it is essential to match behaviour change interventions to people's stage because each of the stages of behaviour change involve different cognitive processes and require different treatments or intervention strategies for the overall change process to be successful. For instance, if an individual is in the pre-contemplation stage it is important to raise their awareness about a behaviour in order for them to contemplate making a behaviour change. Without a planned intervention, people will remain stuck in the early stages due to a lack of motivation to move through the stages. Prochaska, Johnson, and Lee suggested a series of activities that have received empirical support, which help individuals progress through the stages such as, consciousness raising – increasing awareness of the causes (providing educational materials, confrontation, media campaigns, feedbacks); dramatic relief – producing an emotional experience which is followed by reduced effect if some action can be taken (personal testimonies, drama, media campaigns); self-reevaluation – inviting individuals to make cognitive and emotional assessments of their self image (clarify values, provide healthy models, using imagery); and environmental reevaluation – assessment of how the presence or absence of a behaviour might impact on one's social environment (documentaries, personal stories). A major insight offered by stage theories of behaviour change is the emphasis they place on matching interventions to the stage of readiness of the individual. This kind of approach provides an excellent framework for understanding and examining individual differences in motivation for, and involvement in, change in road safety behaviours of commercial drivers over time, including patterns of initiation, maintenance, relapse, and resumption.

2.2.8 Etzioni's Compliance Theory

Etzioni developed an innovative approach to the structure of organizations that he called compliance theory. He classified organizations by the type of power they use to direct behaviour

of their members and the type of involvement of the participants. Etzioni identified three types of organizational power: coercive, utilitarian and normative, and related these to three types of involvement: alienative, calculative and moral.

Figure 4: Etzioni's Compliance Types

Types of power

Types of involvement	**Coercive**	**Utilitarian**	**Normative**
Alienation	X		
Calculative		X	
Moral			X

Source: Amitai Etzioni, (1975). *A Comparative Analysis of Complex Organizations*, rev. ed. (New York: Free Press).

Coercive power uses force and fear to control lower-level participants and organizations that rely on coercive power include prisons and training in the military. Utilitarian power uses remuneration or extrinsic rewards to control lower-level participants. This reward includes salary, fringe benefits, working conditions and job security and is used by unions and government agencies. Normative power controls through allocation of intrinsic rewards such as interesting work, identification with goals and making contribution to society. Management's power in this case rests on its ability to manipulate symbolic rewards, allocate esteem and prestige symbols and influence the distribution of acceptance and positive response in the organization and is used by churches and political organizations. According to Etzioni, all three types of power can be useful in obtaining subordinates cooperation in organizations. However,

the relative effectiveness of each approach depends on the organizational participant's involvement. Etzioni said involvement refers to the orientation of a person to an object, characterized in terms of intensity and direction. Accordingly people can be placed on an involvement continuum that ranges from highly negative to highly positive. Etzioni suggested that participant involvement can be broadly categorized as alienative, calculative or moral. Alienative involvement designates an intense negative orientation; calculative involvement designates either a negative or positive orientation of low intensity; and moral involvement designates a positive orientation of high intensity. According to Etzioni, when an organization employs coercive power, participants usually react to the organization with hostility, which is alienative involvement. Utilitarian power often results in calculative involvement, that is, participants desire to maximize personal gain. Normative power frequently creates moral involvement, that is, participants are committed to the socially beneficial features of the organization.

In applying this theory to the study, transport unions and organizations should use utilitarian and normative powers to gain compliance from their members. If the leaders use types of power that are not appropriate for the environment it can reduce organizational effectiveness. Depending on the circumstances, road traffic legislation and enforcement agencies can use any of the three types of power to gain compliance from road users. Road safety education providers can use both utilitarian and normative powers in the provision of driver education and training, but if they use coercive control in gaining driver compliance, this can lead to the displacement of educational goals.

2.3 Demographic Factors of Driving

There were several demographic factors that were related to crashes. Age was associated with crash involvement with younger drivers having a higher crash risk (McKenna, 2006). The vast majority of new drivers as explained by McKenna tend to be young which was particularly unfortunate because young drivers tend to choose faster speeds, adopt closer following distances, have poor hazard perception skills and have higher proportion of their driving at night. Having passed the practical driving test (Hutchins, 2008), newly qualified drivers are immediately entitled to drive unaccompanied and they find themselves without the support of an experienced and qualified driver and have to face a plethora of new and demanding challenges such as navigation to destinations without instructions; decision making for road and traffic hazards; and coping with situations potentially not experienced in their driving lessons.

Sensation seeking was found as the underlying factor in the age effect, and that younger drivers were higher in sensation seeking which was associated with risky driving such as speeding. Another factor that underlies the age effect was experience. McCartt, Shabanova and Leaf (2003), explained that driving experience was an important factor and it was found out that the crash rate decreased rapidly in the first couple of months of driving. McCartt et al. (2003) gave three options for increasing experience in a safe manner. One was to provide a graduated licensing system in which the first few months drivers are not allowed to expose themselves to high risk situations such as night driving. Another method was to extend the training phase to increase supervised driving and the third method was to focus on hazard perception since it was known that inexperienced drivers were slow to detect hazards. Gregersen, Berg, Engstrom, Nolen, Nyberg & Rimmo (2000) believed that increasing the licensing age and increasing the experience of new drivers would be effective. Extending the licensing period for practice was

implemented in Sweden and produced a decrease in crash involvement. According to Hutchins (2008), the driving learning process continues long after passing the practical test and the withdrawal of support and the requirement to drive independently result in increased accident liability.

Thew (2006) thinks there are demographic differences in crash rates and although young people tend to have good reaction times, disproportionately more young male drivers featured in accidents. This he explained, result from the fact that many young males exhibited behaviours and attitudes to risk that could place them in more hazardous situations than other road users. Older drivers with slower reaction might be expected to be involved in more accidents, but this had not been the case as they tend to drive less and, apparently, more cautiously. Hutchins (2008), identified some challenges faced by solo drivers as poor opportunity for feedback, involvement in a variety of traffic conditions, different manoeuvres, unexpected actions of other drivers, different types of road and distractions. Hutchins also mentioned some skill deficits new drivers need to safely interact with the driving environment as poor appreciation of their own abilities; poorly developed mental models of driving; and poorly developed hazard perception and visual scanning.

National Highway Traffic Safety Administration (1998) believes that young people today are driving in a more complex traffic environment than ever before. There are more cars, more congestion, more complex intersections and roadways, and today's drivers are considered by many to be more rude, aggressive, and distracted. Young drivers are influenced by the complexity of this environment as well as many other factors in their lives, as a result, in spite of safer vehicles and roadways; driver behaviour remains frustratingly less than ideal. In a study

conducted by the National Road Safety Commission (2006), the demographic profile of the driver population was determined to be very favourable for good safety practice. Most of the drivers (80 percent) were male adults within the active age group of (18-59). About 80 percent of them were educated with about 60 percent meeting the minimum requirement of Junior Secondary Education set by the Driver and Vehicle Licensing Authority (DVLA) for 2008. The mode of training was predominantly informal resulting in the transfer of bad driving habits from one bad driver to the other. About 12 percent were even self-taught, which poses a great danger to other road users. Even though most of them (70 percent) claim to have valid "DVLA licenses", only 19 percent of them were driving with valid licenses. Much as their knowledge in driving rules and regulation was acceptable, knowledge in road signage and marking was poor.

2.4 Methods Used to Change Road Safety Behaviour

Road safety interventions seek to manage exposure to the risk of crashes, prevent crashes, and reduce crash injury severity and the consequences of crash injury. Interventions comprises standards and rules specifying how the road network is to be used safely by setting speed and alcohol limits, occupant restraint and helmet requirements, vehicle standards and vehicle and driver licensing requirements. They also comprise systems for ensuring compliance with standards and rules using a combination of education, enforcement and incentives (Bliss & Breen, 2008). Success in managing road safety outcomes requires a systematic and planned response and strengthening across the road safety management system. Road safety was viewed by several international organizations as a production process, where institutional management functions provide the engine room to deliver a range of effective, system-wide interventions to achieve results, expressed as long-term goals and interim quantitative targets (Global Road

Safety Facility World Bank, 2009, cited in United Nations Economic Commission for Europe, 2010).

In-depth analysis of incidents on the road network showed that an accident was the consequence of one or more faults in a complex system involving drivers, vehicles, the road and its surroundings. However, the principal factor in road accidents was human error, so that any effort to increase the level of road safety has to be primarily aimed at the prevention of this type of error as well as at ways to reduce the consequences without, however, ignoring other factors linked to the infrastructure and to vehicles (United Nations Economic Commission for Europe, 2010). According to accident data studied by the United Nations Economic Commission for Europe, the vast majority of traffic accidents were attributable to problems in road user behaviour. Such behaviour was often related to a failure to observe regulations relating in particular to speed, alcohol, seatbelts, or to a poor understanding of specific traffic conditions that require heightened caution, such as night-driving. The review of literature describing past efforts to change road user behaviour focused on four practical approaches: legislation, enforcement, reinforcement and education. One of the main conclusions of the review was that each of these approaches works better when used in conjunction with one or more of the others.

2.4.1 Legislation

All countries active in road safety aimed to ensure that appropriate legislation was in place to meet the road safety task set out and agreed within the national road safety strategy. Typically, a comprehensive framework for the road traffic system safety will have evolved over many years. As stated by Bliss and Breen (2008), the 'legislation' function involved:

- Reviewing the scope of the legislative framework periodically;

- Developing legislation needed for the road safety strategy with due consideration to cost-effectiveness, practicality and public acceptability;
- Consolidating legislation; and
- Securing legislative time for road safety.

This function ensured that legislative instruments for road safety were well-matched to the road safety task. Road safety legislation typically addresses land use, road, vehicle, and user safety standards and rules and their compliance, as well as post impact medical care (Bliss, 2004). According to Bliss, road safety legislations in most countries in the world evolved around a number of risk factors for road traffic injuries such as speed limits, seat belt and child restrain use, blood alcohol limits, daytime running lamps, and mobile phone use.

The National Traffic and Motor Vehicle Safety Act were enacted in the United States to empower the federal government to set and administer new safety standards for motor vehicles and road traffic safety in response to increasing number of cars and associated fatalities and injuries on the road following a period when the number of people killed on the road had increased 6-fold and the number of vehicles was up 11-fold since 1925 (National Safety Council, 1980). By 1970, motor-vehicle-related death rates were decreased by both the public health measure (deaths per 100,000 population) and the traffic safety indicator (deaths per vehicle miles travelled). Changes in driver and passenger behaviour also reduced motor-vehicle crashes and injuries. Enactment and enforcement of traffic safety laws, reinforced by public education, have led to safer behaviour choices.

United Nations Economic Commission for Europe (UNECE, 2010) said establishing driving permit legislation was indispensable in the process of improving driver behaviour, particularly

through the driving tests to obtain a driving license. Responding to those road safety demands requires in particular minimum conditions to be established for the issue of driving permits, the definition of the knowledge, skills and behaviour necessary for driving a motor vehicle, the structure of the driving test in relation to these concepts and a definition of the minimum standards as regards physical and mental fitness to drive these vehicles. At the same time particular attention should be paid to possible means of attaining these road safety goals, such as promoting progressive access to different categories of permit, checking that drivers are maintaining the required skills and combating all possibilities of fraud. In this context, greater account also needs to be taken of groups of drivers presenting specific needs such as the handicapped and elderly persons, or specific risks such as young drivers, whether with regard to driving permits or to road safety education. Penalties for people who commit serious driving offences as pointed out by UNECE (2010), must naturally be commensurate with the gravity of the offence, but special attention should also be paid to rehabilitation, for example by introducing specific programmes for offenders. In countries that have introduced programmes of this kind the results, notably a reduction in the number of repeat offences, have been encouraging. Countries that also use a probationary or points-based permit system explored the benefits of rehabilitation courses that offenders took for a permit which has been withdrawn to be restored.

While a new law has significant impact, due mainly to the publicity it gets, legal theorists and researchers generally agreed that legislation by itself has limited influence. According to them, the initial effect declines fairly rapidly and as such, legislation needs more support over the long term if it is to play a dynamic, effective role in permanently changing road user behaviour (Lonero et al., 2007). Effective enforcement, as explained by the researchers, helps to create a credible deterrent and encourages people to develop the habit of compliance. Reinforcements

such as prompts, feedbacks and incentives on the other hand, could increase people's desire to develop good driving habits. Education also helps people develop knowledge, skills and changes in attitude, and feeds the development of internal and informal social controls.

2.4.2 Effects of Different Types of Legislation

UNECE (2010), pointed out that of the estimated 1.2 million people killed on the roads world-wide each year, 85 percent die in low and middle-income countries, where the use of injury protection devices such as seat belts and child restraints is very low. According to the Commission, failure to use a seat belt and improper use of a child restraint system were major risk factors for motor vehicle occupants. Seat belts and child restraint systems they said had been effective in reducing death and serious injuries in road traffic crashes. Crash research in various countries had found that the rates of seat belt wearing were lower in fatal collisions than in the general population. The level of seat belt use the Commission believed was influenced by mandatory legislation and enforcement accompanied by publicity campaigns. The level of child restraint use was also influenced by laws mandating use of child restraints; public information and enforcement; incentive and education programmes to support enforcement; and child restraint loan schemes. Evaluations of the effect of legislation on seat belt use by Lonero et al., (2007) considered two criteria, usage rates and casualties. They agreed that generally, legislation substantially increased seat belt use initially, but the effect fell off over time. However, even after time, the usage rate remained higher than before legislation. Use rates in Canada reached over 90 percent as public agencies bolstered the effects of their laws with coordinated education and enforcement efforts.

Safety belt use began to increase following enactment of the first state mandatory-use laws in 1984 (Graham, 1993). There were primary laws which allow police to stop vehicles simply because occupants were not wearing safety belts. These as indicated by Graham, were more effective than secondary laws which require that a vehicle be stopped for some other traffic violation. However, maximum effects were created when legislation was accompanied by enforcement. Seat belt legislation in North Carolina was introduced with a grace period before enforcement. There were few published evaluations of child restraint laws. Those that existed showed that the effects have not been dramatic. A study of five states in the United States (U.S.) found that legislation doubled the average use rate, but the impact varied widely among the States. Consequently, a combination of legislation, police enforcement, education and information campaigns was necessary to achieve and maintain significant increases in seat belt and child restraint use.

Some States of the U. S. introduced helmet laws and then repealed them in the face of public complaints about loss of freedom and mobility. This allowed a study design that permitted evaluation before legislation, after legislation, and after repeal of the legislation. The U. S. General Accounting Office (GAO) reviewed 46 studies on helmet laws in the U.S. The review concluded that helmet use reduces serious and fatal injuries. The review however, did not support rider complaints that helmets restrict hearing and vision and cause neck injuries in crashes (GAO, 1991).

The most important legislative development in the field of Driving While Intoxicated (DWI) had been the introduction of per se laws that base conviction on the alcohol level in the driver's blood rather than on proof of dangerous driving. Since the late 1960s, such laws had been introduced in

Canada, Britain and most states in the U.S. It was well known that driving requires concentration, attention, the right skills, common sense and a concern for the safety of everyone on the road, especially for the vulnerable user. Alertness, perception of the dangers and reaction time could make the difference in the interaction between the driver and the external environment. Peden et al. (2004), in "The World Report on Road Traffic Injury Prevention," classified drinking and driving as one of the five principal risk factors in road safety. The relationship of alcohol to collisions has been well demonstrated. Drivers who have been drinking have a much higher risk of collision involvement than drivers who have not been drinking, and this risk increases rapidly as blood alcohol concentration (BAC) increases. A legal limit on BAC for motor vehicle drivers was set in almost all European countries and defined when a driver was presumed to be too impaired to drive safely. In Europe the BAC legal limit was as low as 0.0 g/l or as high as 0.8 g/l, the most common legal BAC limit being 0.5 g/l. Lower BAC limits however, were often established for young drivers and for drivers of commercial vehicles (United Nations Economic Commission for Europe, 2010).

Also, the substances that negatively affect the capacity of driving vehicles included drugs, narcotics, psychotropics, chemical substances and medicines. These substances could seriously impair the perception of the driver, lessen his/her ability to interact and deal safely with unforeseen or unexpected events and may lead to lethal outcomes both for the driver and for other road users. Studies and research according to United Nations Economic Commission for Europe, (2010) suggested that each year a significant number of people were killed or permanently disabled as a consequence of road traffic accidents associated with driving under the influence of substances. In general, authoritative lists of all the types of substances which may impair driving do not exist. Moreover, while solid documentation existed on the relationship

between blood alcohol level and crash risk, the same extent of documentation was not yet available for driving under the influence of substances. During a roadside check it was difficult to identify and classify if a driver was under the effects of substances at that moment.

Moskowitz (1989) had shown that DWI legislation, coupled with enforcement programmes, had an effect, at least in the short term. Increased penalties, additional proceedings and per se laws Moskowitz explained ensured fewer fatal crashes, an effect that lasted between a few months and a couple of years. One possible reason why effects of legislation did not last, Lonero et al., (2007) believed, was the low probability of apprehension; one study according to them suggested that there was one arrest per 200 impaired trips. Greater enforcement, they explained, puts a strain on the court system without any real reduction in traffic crashes. In the state of New South Wales, in Australia, they said a programme that involved legislative changes, heavy random breath testing and massive publicity, managed to remain effective over a number of years.

Annual motor-vehicle crash-related fatalities involving alcohol has decreased in the U.S. since 1989 (NHTSA, 1997). Factors that may have contributed to this decline included increased public awareness of the dangers of drinking and driving; new and tougher state laws; stricter law enforcement; an increase in the minimum legal drinking age; prevention programmes that offer alternatives such as safe rides (such as taxicabs and public transportation), designated drivers, and responsible alcohol-serving practices; and a decrease in per capita alcohol consumption. According to Lonero et al. (2007), there could be sanction of losing one's driving license or jail sentence, but there was a lot of evidence to suggest that losing one's driving license was more effective than fines or jail sentences. They argued that most suspended drivers continue to drive, but apparently much more carefully, and they tend to acquire greater skills and better habits that

continue after suspension was ended. Jail sentences they said could be counter-productive because offenders lose the chance to improve their driving skills through practice. They emphasized that the effectiveness of legislation depends on how its implementation was managed in conjunction with other initiatives such as enforcement and education. For longer-term effects new social norms have to be set around DWI with legislation serving as a focus for education, publicity and group activism.

The results of a survey of legislative attempts to influence road user behaviour by Lonero et al. (2007) suggested the following guidelines in introducing new legislation:

- The reasons for, and the benefits expected from the legislation should be communicated clearly to the public and the media. It should not be assumed that people understood the reason(s) for it;
- The influence and deterrence of legislation by explicit planning, implementation and evaluation must continue to be improved. Complacency leads to deterioration in effect;
- Deterrent effects must be improved with supporting initiatives in enforcement and publicity developed after analysis of the target populations and their current behaviour;
- Individual values and controls related to health issues and the social costs of careless or irresponsible road use behaviours must be supported;
- There should be a look beyond short-term effectiveness of new legislation with careful deliberate interventions designed to maintain positive behaviours and an optimal mix of effective supporting initiatives; and
- There is the need to develop social norms favouring safe road use that will build on people's self-regulating processes.

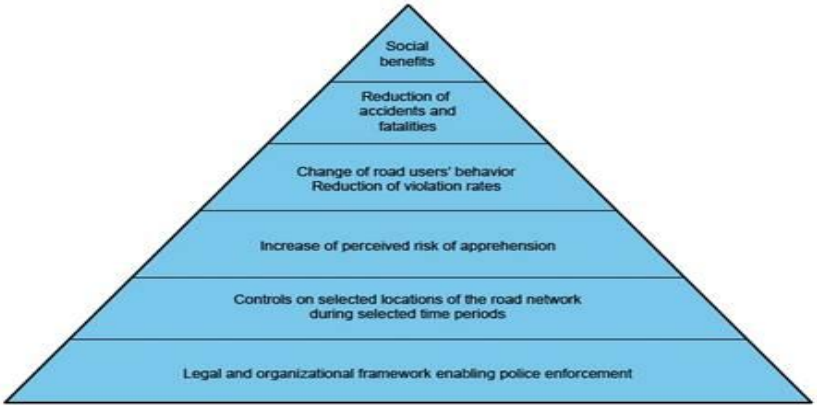
2.4.3 Enforcement

Peden et al. (2004) believed that traffic law enforcement was one of the instruments to secure or improve traffic law compliance. The concepts of 'traffic law enforcement' and 'police enforcement' they said were often used interchangeably but they differ in width. They explained that traffic law enforcement was wider and covers the entire enforcement chain, from detection of a violation through to the penalty, while police enforcement refers to the actual work of detecting a traffic law violation, apprehending the offender, and securing the evidence needed for his prosecution. Police enforcement they reiterated could only be effective if it operated in a supportive environment of laws, regulations, and a sensitive penal system. Consequently, the effectiveness of police enforcement cannot be seen in isolation from how the police collaborate with the other parties in the traffic law enforcement chain. According to Zaal (1994), traffic law enforcement influences driving behaviour through two processes: general deterrence and specific deterrence. General deterrence was defined by Zaal as the impact of the threat of legal punishment on the public at large. Specific deterrence was seen as the impact of the actual legal punishment on those who were apprehended. Thus, general deterrence resulted from the perception of the public that traffic laws were enforced and that there was a risk of detection and punishment when traffic laws were violated. Specific deterrence resulted from actual experiences with detection, prosecution, and punishment of offenders. The general assumption underlying police enforcement according to Goldenbeld (1995) was that, it should primarily aim at general deterrence, which was achieved by increasing the subjective risk of apprehension. The effectiveness of police enforcement was larger if police enforcement was accompanied by publicity, unpredictable and difficult to avoid, a mix of highly visible and less visible activities, primarily focused on times and locations with high violation (maximum feedback to potential

offenders), and continued over a longer period of time. These general principles, Goldenbeld (1995) stated, may need further region-specific tailoring to account for regional differences with regard to violation levels, road network status, and sometimes even social norms because research had shown regional differences in the effectiveness of police enforcement.

Yannis, Louca, Vardaki, and Kanellaidis (2004), described the hierarchy of road safety enforcement. The legal and organizational framework enabling police enforcement provided the foundation for the actual policing operations. Such a framework will result in well-planned, intensified police controls on selected locations of the road network, resulting in an increase in the perceived risk of apprehension. As a result violation rates will decrease. Changes in road user behaviour will result in less traffic crashes and less traffic victims, and in reduced monetary costs for society (social benefits). The figure 2 describes this ideal scenario.

Figure 5: The hierarchy of road safety enforcement.



Source: Yannis et al. (2004)

Speed, as explained by Yannis et al., was at the core of the road safety problem and there was a strong relationship between speed and both the number of crashes and the severity of the consequences of a crash. If the number of speeding violations on the roads could be reduced,

many lives would be saved. According to Yannis et al., there was no single solution to the problem of excess and inappropriate speeds. A package of countermeasures was necessary in increasing the effectiveness of each individual measure and police enforcement was one of the countermeasures. The most appropriate combination of measures they said was determined by the circumstances. Wegman & Aarts (2006) proposed an integrated, systematic and stepwise approach to speed management:

Step 1: Setting speed limits - A speed limit needs to reflect the safe speed on that particular road, related to road function, traffic composition, and road design characteristics. Furthermore, a speed limit needs to be credible, that is, it must be logical in the light of the characteristics of the road and the road environment.

Step 2: Information about the speed limit - The driver must know the actual speed limit, always and everywhere. This could be done by either by the use of consistent roadside signing and road markings, or by the use of in-vehicle systems that inform drivers about the speed limit in force.

Step 3: Road engineering measures - At particular locations low speeds are crucial for safety such as near schools, at pedestrian crossings and at road intersections. At these locations, physical speed reducing measures such as speed humps, road narrowing and roundabouts could help to ensure cars maintaining a safe speed.

Step 4: Police enforcement to control the intentional speeder - If steps 1 to 3 have been applied, unintentional speed violations will have become an exception. Drivers, who then

still exceed the speed limit, do so intentionally. Police enforcement will remain necessary to control and punish that group of drivers.

Each of the steps 1 to 4 as explained by Wegman & Aarts (2006) has to be accompanied by information to drivers on the problem of speed and speeding, what the speed limit system is based on and why, what additional measures have been taken and why, and on the (positive) outcomes of these measures. Within the area of police enforcement, focus was on speed enforcement for two reasons: First, the relationship between excess speed and un-safety was well-established and speed control was one of the major spearheads of road safety programmes world-wide. Secondly, speed enforcement merited special attention in view of the variety of policing methods used to prevent speeding violations and the continuing technological developments in this area. However, that police traffic enforcement involved much more than just speed enforcement (Peden et al., 2004). The most important requirement for speed enforcement was that it deters drivers from speeding; not only those drivers that have been apprehended for a speeding violation, but even more so, those who have not. This was what was called general deterrence (Zaal, 1994) and for a maximum effect, it is advisable to focus the speed enforcement operations on roads, situations, and times where speeding was considered to have the largest effect on the road safety level.

In major reviews, Organization for Economic Cooperation and Development (OECD, 1999) concluded that enforcement targeted at a limited number of high risk violations was more effective in reducing road crashes than non-targeted general enforcement. There were various reasons given:

- **Organizational:** Given the limited amount of manpower and equipment of police, the enforcement managers will always aim to get maximum value from scarce resources. Focusing on a limited number of high risk violations was more efficient than a non-focused general enforcement approach.
- **Road safety:** Focusing on one or more high risk violations such as speeding, drink driving, seat belt use and red light running was also justifiable given the scientific evidence of the relationships between these violations and road safety risk;
- **Communication:** it was easier to communicate to road users about a limited and specific number of violations than about traffic violations in general.

Zaal (1994) identified two main methods of speed enforcement. The first one was to check drivers alongside the road and stop offenders and this was often called stationary enforcement or physical policing. Physical policing Zaal explained made use of manned (visible or invisible) observation unit and a manned (visible) apprehension unit where the offenders were stopped. When physical policing was randomized in time and location over a large part of the road network, this type of enforcement was called random road watch or network-wide random enforcement. The second method according to Zaal (1994) was to detect speed offenders by means of a speed camera and to send them a fine or a notification by mail. Speed cameras he stated, could be used fulltime at fixed locations (fixed cameras) or can be rotated over different locations (mobile cameras). Speed cameras Zaal explained, could also operate automatically (unmanned) or as part of a manned control (either in a visible or in a hidden car or van).

Psychologists have also pointed out that speed enforcement was essentially an extrinsic motivational approach that relies on negative, external factors like fear of punishment, to change

drivers' speed behaviour. This would diminish the intrinsic motivation of drivers to conform to the law, because they want to. The use of punishment instead of reward Goldenbeld (1995) believed could be considered as a one-sided psychological approach. Ideally, traffic enforcement was supported by social norms in a society, and visible police enforcement operations remind road users of the importance of rules and urge them to comply with traffic rules. Whereas, at first, rule compliance may be extrinsically motivated by the aim to avoid punishment, later on drivers may actually change their personal belief about what is the right behaviour and internalize traffic rules. According to Goldenbeld, over the last four decades, under the combined influences of new laws, police enforcement, and public communication campaigns, many drivers worldwide have come to accept the rule 'no drinking and driving' as a strict, personal norm. This positive development towards an intrinsic motivation for a traffic rule was probably more difficult to achieve for speeding behaviour. For many drivers, the relation between personal speeding and crash risk was less evident than the relation between alcohol and crash risk. More information about the effect of speed on crash and crash severity may help to increase the intrinsic motivation to comply with the speed limit.

Rothengatter (1982) reviewed literature on the short-term effects of enforcement on driver behaviour. He identified three kinds of effects:

- On-view effects – when a driver can see a police unit it can have a substantial impact on elements such as speed, lane choice, overtaking and obeying traffic lights, but the effect operates over narrow ranges of time and distance;
- Memory effect – when a driver travels the same stretch of roadway, it has been measured to last as long as two weeks;

- General "halo" effect – when enforcement influences behaviour over a wide geographic area.

Boom (1983) cited by Lonero et al. (2007) suggested targeting high-risk locations, times and types of violators to create an image of police omnipresence. He hypothesized that drivers' increased awareness of traffic police would make them more careful and would result in fewer traffic violations. Behaviour often changes in the presence of enforcement, particularly if the perceived probability of non-visible enforcement is high enough. Consequently, actual probability is a key factor in the strategy of enforcement authorities, who can be thought of as the driver's opponent in a formal "game." Changes in the behaviour of one player influence the behaviour of the opponent. Bjornskau and Elvik (1992) offered the idea that drivers' perceptions of the chances of being ticketed were based on the level of enforcement and the level of enforcement set by authorities depended on the speed level of drivers. If more drivers speed, then more enforcement was applied and some drivers slowed down. If speeding was greatly reduced, enforcement would be reduced, and this would cause speeding to increase again. This resulted in a highly unstable situation.

It was concluded by Lonero et al. (2007) that enforcement of road user legislation will be half-hearted because if too much enforcement is set up, it will upset the balance and lead to fewer violations. Then enforcement will have to be reduced. The game model made it clear that fully rational, predictable behaviour could lead to less-than-optimal safety results. They also emphasized that violations and road crashes could be permanently decreased if enforcement was not reduced once it was successful. The most obvious way to do that, they argued, was by automatic surveillance. For manual enforcement, however, an effective strategy would be to

allocate enforcement randomly and to keep it at a level just above the "equilibrium strategy," found by evaluation of the effects of enforcement over time.

2.4.4 Effects of Different Types of Enforcement

Police "job actions" (reduced work or strikes) in Finland and the U.S. had provided opportunities for road safety researchers to study the effect of reduced enforcement. They had found that diminished police presence affected speed and speed variance but had little short-term effect on the number of collisions. Hauer, Ahlin and Bowser (1982) studied the direct local effects of visible enforcement on speeding in four experiments in Metropolitan Toronto. They explained that when enforcement was visible, average speeds were sharply reduced at the sites. There was a "downstream distance halo effect" that decayed by half every 900 meters. There was also an "upstream halo effect" attributed to CB radio warnings, light flashing and prior experience at the site. A "time halo" was noted, with one day of enforcement having a noticeable effect for about three days, and longer enforcement creating a longer halo.

There have been many evaluations especially in the U.S., where efforts were made to raise seat belt use rates in States that have mandatory use laws. The enforcement programmes began with high baselines created by the introduction of legislation. Consequently, they were focused on the more resistant drivers. Clearly, enforcement raised belt use rates substantially, especially when implemented with publicity and other measures. Beliefs about the motivation for enforcement serve as a barrier to road safety. Evans (2004) cited in McKenna (2006) noted that authorities were accused of using traffic enforcement for revenue collection as opposed to harm reduction. McKenna (2006) also saw public perception of the role for the police as barrier to road safety. According to him, argument frequently encountered was that the police should be out catching

real criminals rather than traffic violators. McKenna believed that law breaking by traffic violators could be discouraged by punishing offenders. He explained further that since people were motivated to avoid punishment then success should follow.

McKenna mentioned two features of deterrence as severity and certainty. Severity he explained referred to the magnitude of the punishment with the proposal that as the magnitude of the punishment increases so also does the deterrent effect. Certainty as pointed by McKenna referred to the probability of detection with the proposal that as the probability of detection increases so also does the deterrent effect. However, McKenna argued that although there was consensus that certainty does have an effect, the concern was that the level of detection was too low. The chance of an individual being caught by the police for a traffic offence was very low. In the U.S., (Lonero et al. 2007) there was approximately one arrest for every 5,000 miles of drunk driving. This rate of enforcement will discourage compliance because of the low risk of sanctions. Highly visible police surveillance, he said, had significant effects on violations. However, those effects were temporary. What was needed as he explained were cues that signal a high degree of certainty that enforcement may take place and have a long duration. McKenna developed an approach for speed enforcement. According to him, to produce a high perceived perception of detection, safety cameras were employed and their positions were prominently displayed. By signaling the presence of the camera drivers were aware that the possibility of detection was high. The issue of duration was addressed by the camera because it could be left operating day and night. The perceived legitimacy was addressed in three ways:

- The cameras were located at areas with a known safety problem so the issue was transparently crash reduction not revenue collection;

- The prominent warning of the cameras made the speeding detection a voluntary offence for the attentive driver;
- Drivers who were caught were offered rehabilitation rather than just punishment.

McKenna stressed further that the rehabilitation was not offered solely to support the issue of perceived legitimacy; otherwise it may support compliance rather than conformity. Conformity he said referred to an enduring change in attitude and behaviour in respond to pressure while compliance referred to a transitory shift without any real change. In other words drivers may comply only in the presence of an impending penalty but with no change in attitude to speeding. It might be argued that speed is just one offence so what about all the other risk behaviours. Hogg & Vaughn (1995) cited in McKenna (2006) believed that although methods to detect risk behaviours such as close following or mobile phone use were available, they were not as developed as those for speed. Also, when speed was used as the method of detection, other risk behaviours could also be identified. They gave reasons for covering a broad area of risk behaviours rather than confining attention solely to speed:

- Crashes have multiple causes including those other risk behaviours;
- Those who tend to speed also tend to engage in other risk behaviours. That is, those who are more likely to speed are more likely to run red lights, drink-drive, so it was good to take advantage of a unique opportunity to address those other risk areas in addition to speeding.

The rigour with which alcohol-impaired driving laws were enforced had a direct effect on the behaviour of persons driving under the influence of alcohol. Increasing drivers' perception of

the risk of being detected was one of the most effective means of deterring alcohol-impaired driving.

The United Nations Economic Commission for Europe (2010), attested to the fact that there was strong evidence from a number of countries for the success of enforcement creating general deterrence on driving under the influence of alcohol, which was, deterring drivers who have not previously been caught. An effective enforcement approach as explained by the Commission included frequent, widespread and highly visible roadside checks. Enforcement, the Commission said was based on the principles of certain detection and conviction, swiftness of the proceeding and on consequences which were severe enough that most drivers would want to avoid them. The penalty strategy they generally found to be most effective was loss of the driving privilege. Some have advocated severe punishment, such as imprisonment, for alcohol impaired driving offences. However, there was little compelling evidence that imprisonment resulted in lower re-arrest rates for convicted drunk drivers. Some studies according to the Commission have shown a deterrent effect for brief mandatory jail sentences of first-time offenders.

Studies according to Lonero et al. (2007) indicated that it required a balanced programme of enforcement with check points, publicity and preventive behavioural measures such as designated driver programmes to increase drivers' perception of the risks attached to Driving While Intoxicated (DWI). Many legislative and enforcement programmes targeting DWI as presented by Lonero et al. had strong initial effects that have dissipated over time. In British Columbia, collision statistics indicated that the greatest effects came with the greatest levels of public awareness. Random Breath Testing (RBT) they said could have a substantial effect on DWI. When South Australia introduced RBT, the publicity it generated produced a greater effect

before it was implemented than after, because it was accompanied by a low level of enforcement. However, the effects in reduced DWI did not last, and there was a marked increase in crashes on back roads as drivers tried to avoid police checkpoints on the main highways. Two other Australian states that introduced RBT with greater enforcement and publicity showed a marked drop in collisions and fatalities. They found that heavy drinkers and those with DWI convictions changed their behaviour more than others. A U.S. study found a need for more standardized and sophisticated sobriety tests that would increase sensitivity to alcohol impairment. Shinar and McKnight (1985) carried out an extensive review of enforcement and related public information that targeted speeding and DWI. They reached the conclusions that: there could be no perceived risk of enforcement without actual risk; enforcement units must be highly visible to be effective; visible enforcement must appear to be a real threat; uncertainty could extend the range over which drives perceive a real threat; and enforcement efforts must be publicized.

Lonero et al. (2007) produced the following guidelines in introducing enforcement measures to modify road user behaviour:

- Resources and coordination must be provided to maximize short-term and short-range effects of enforcement and enhance halo effects.
- Sanctions with real bite, and not just the "cost of doing business," must be created by keeping up to date with public perceptions of probable apprehension.
- Behaviour analysis in police crash investigation must be improved.

2.4.5 Reinforcement

James (2007) said prior interventions have not been successful in reducing dangerous driver behaviour because there were two opposing forces working against each other. There were

external environmental forces for greater safety (less risk): the construction of more and better roads to accommodate the increasing numbers of drivers every year; the design of better and safer vehicles; a more efficient medical infrastructure to handle victims of crashes; greater use of highway law enforcement and electronic surveillance as deterrents. There were internal individual forces for maintaining high risk (less safety): the acceptance of a competitive norm that values getting ahead of other drivers; the daily round schedule of time pressure and its mismanagement through rushing and disobeying traffic laws; the weak driver education programmes so that most drivers have inadequate training in emotional self-control as drivers; the media portrayal of aggressive driving behaviours in a fun context; and the psychological tendency to maintain a preferred level of risk, so that increased risks were taken when the environmental were introduced ("risk homeostasis"). According to James, scientists and safety officials attribute this resistance to accident reduction to the attitude and behaviour of drivers who tend to respond to safety improvements by driving more dangerously. He reiterated that a critical aspect of driving is the driver's competence in balancing risk with safety. The risk in driving is largely under the control of the driver and the driver decides at every moment what risks to take and what to inhibit or avoid. Risk taking is a tendency that varies greatly between drivers as well as for the same driver at different times. Thus, if a road is made safer by straightening it, or by moving objects that interfere with visibility, drivers will compensate for the greater safety by driving faster on it (("risk homeostasis" phenomenon).

Wilde (1988) developed a Risk Homeostasis Theory (RHT), which warns that drivers may negate some improvements in their road user behaviour by compensating in other ways. For example, less DWI or speeding on main roads is of little benefit if it is offset by more collisions on minor roads. The principal interest in RHT was as a framework for understanding how

reinforcements affect road user behaviour, especially incentives. Safety incentive programmes were based upon positive reinforcement of good driving skills and key elements included:

- Standards must be set high but be attainable so as not to reward mediocre behaviour.
- The incentive must be earned.
- The incentive must have some personal value, whether it be an elevation in status, physical reward or both.
- The award should be based upon performance over a reasonable period of time. Not too long or short. For safe driver awards, an interval of yearly was appropriate. For other incentive programmes such as contest, three or six months were appropriate.
- For drivers, individual performance, rather than group performance should be used as criteria.
- It is better for many participants to receive small awards rather than one person to receive a big reward.
- The presentation of an award should be preceded by a celebration to emphasize the importance.

A number of studies reported by Lonero et al. (2007) have also looked at the effects of combining enforcement with feedback signs. One study on two major commuter routes into Dartmouth, Nova Scotia, found that feedback signs such as percentage of drivers not speeding last week, or "Best Record" percentage, substantially decreased the number of drivers who drove at more than 10 km over the limit. Some studies also found that the effect of feedback signs was further increased when police stopped speeders and gave them informational materials and warning tickets, and when police stopped drivers who were traveling close to the limit, thanked

them, and gave them token rewards. In the latter case, the number of drivers traveling more than 10 kilometers per hour over the speed limit was reduced by 48 percent and those going more than 20 kilometers per hour over the limit by 64 percent. Studies of the effect of boosting enforcement by doubling patrol density also showed significant effects.

A systematic evaluation of incentives in road safety was carried out in California (Harano & Hubert, 1974). In an innovative and large-scale driver improvement experiment, drivers who had caused crashes or committed violations in the previous year were informed that their licenses would be extended free for 12 months if they maintained a clean record in the forthcoming year. This carried with it a deferral of the written driver's examination, usually required for license renewal. A control sample of drivers was set up. Significantly fewer drivers in the incentive group had collisions in the first follow-up year. The effect was strongest among the younger drivers and those whose license renewal was to come up within one year after receipt of the letter. In another experiment, a group of drivers was given the free license extension without warning, as a simple reward for a one-year clean record. These drivers performed worse than controls in the subsequent period. These complex findings offered a cautionary note on the use of potentially powerful behavioural techniques that can clearly help but may also harm or be ineffective, depending on details of programme design. Evaluation using appropriate experimental, and control groups is especially critical.

Lonero et al. (2007) confirmed that a large number of evaluation studies have been done on incentive programmes for seat belt use. In general, these studies showed substantial increases in seat belt use when a positive reward was attached to their use. Follow-up studies showed that,

although peak use levels slipped, belt use had become habitual for some, and use rates remained above the original baseline.

2.4.6 Effects of Different Reward Types

In a review of seat belt use in programmes in 28 corporations, using various combinations of the rewards, Geller, Rudd, Kalsher, and Lehman (1987) noted that they were all effective well beyond the end of the programme. But surprisingly, the strongest and longest lasting effect came from the no-reward programme, which included a participative education component. Other studies also showed that no-reward programmes had an effect that lasted longer after the programme had ended. Researchers have suggested that people better internalize the motives for their actions when the external inducement was small but effective.

Geller (1990) reviewed a variety of intervention tools that have been used to increase seat belt use and decrease DWI and they included vehicle reminder systems such as buzzers and chimes, buckle-up reminder stickers and flashcard cues, education and information programmes, and television and movie depiction of seat belt use. Tools used to suppress DWI behaviour included feedback such as monitoring blood alcohol levels, modifying the drinking environment (for example "happy hour"), and server education. These seemed weak in comparison to those used for motivating greater seat belt use. Geller pointed out that behaviour analysis was better at encouraging desirable behaviors than discouraging undesirable ones. Russ et al. (1989) in Lonero et al. (2007) reviewed a number of studies that suggested that giving drivers' feedback on their blood alcohol level may be counterproductive. A possible reason was that this feedback measures drinking performance rather than driver performance. These kinds of evaluations reminded us that powerful behavioural techniques do not automatically work. As with other

approaches, they needed to be carefully designed, evaluated and refined. The survey of reinforcement initiatives for influencing road user behaviour suggested the following guidelines for future work in this field (Lonero et al. 2007): behaviour-analysis techniques to be used in operational programmes to identify target behaviours and influence them; practical incentives and feedback programmes should be developed with appropriate evaluations to maintain their effectiveness; and road users should be encouraged to develop internal controls, such as a wellness approach to their entire lifestyle and social responsibility.

2.4.7 Education

In the mid 1980s the Road Transport Research Programme of the Organization for Economic Cooperation and Development (OECD) assessed the effectiveness of road safety education programmes (OECD, 1986). It concluded that road safety education programmes must be explicit about educational objectives, and that these should include intermediate measures as well as measures aimed at reducing collision losses. As pointed out by OECD, what a programme try to teach must relate directly to those tasks a road user needs to learn. However, as explained by OECD that presented a problem because there was a lack of empirical knowledge about what skills a road user should have. Programme objectives, the report said, must also take into account the skills and motives road users already have. In addition, the report addressed many other variables that have to be considered such as the content of programmes, where they are taught, how much is taught, how often, and cultural differences.

Canberra (2012), believed that enforcement should not be relied upon as the sole means of reducing traffic accidents. Rather, enforcement, good roads and good road signs should be supported by high levels of public and driver education and programme evaluation. Canberra

stressed that publicity and education were essential requirements to raise community awareness and improve the effectiveness of enforcement operations. He however said it was essential that road users actually observe the publicized increased level of enforcement activity; otherwise, behavioural changes may only be short-lived. Canberra also mentioned the incorporation of police education programmes to educate the police on road safety and cost benefits associated with enforcement operations and also, road safety to be made an integral component of driver training. Public education he believed also plays a big part in educating drivers on safety and getting them to obey traffic laws.

Education as a prevention approach was used in an attempt to reduce alcohol impaired driving by altering social norms, changing risky or dangerous behaviours and creating safer environments. Communication and education also provided information to the public about the dangers and the consequences of alcohol-impaired driving. While education and public information were necessary to improve public awareness and supporting enforcement policies, they needed to be part of a comprehensive strategy, and seemed to work best when linked with highly visible enforcement efforts. Many impaired driving offenders have alcohol dependency problems and without appropriate assessment and treatment, these offenders were likely to repeat their crime (United Nations Economic Commission for Europe, UNECE, 2010). UNECE believes that the education of drivers should start at an early age by parents, in elementary and secondary schools and finally in training and examinations for acquiring driving permits. The early steps in road training according to them will contribute substantially to safe behaviour in adolescence and later on in life. To ensure that children and adolescents receive road safety education, the NSW Government provided road safety education programmes for them in school (Roads and Maritime Services, 2011). The rationale of the programmes was to produce behavioural change

through programmes and campaigns and the programme was to act as advocate for children in road safety, provide appropriate resources for teachers and students and lobby for best practice. The programme was provided at the early childhood, primary school, secondary school and tertiary schools.

In view of UNECE (2010), the fact that the vast majority of road accidents were linked to inappropriate behaviour on the part of road users, effort should be made to change it and stop accidents from being a commonplace occurrence. One of the efforts mentioned to achieve this was making road users aware of the dangers of the road and the risks they incur by not observing the rules through communication. Communication strategies and awareness campaigns they said kept drivers up to date and alert, they mobilized and motivated parents, schools and other social institutions. They also created the awareness of the general public that was a necessary basis for good road traffic safety. Communication was also carried through the press, radio and television, the use of which was indispensable for launching road safety campaigns. In order for these campaigns to be effective and achieve the goal they have been given, it was important to establish communication strategies. The Commission, however, noted that communication alone, used in isolation, does not permit modification of behaviour in principle. All campaign assessments showed that information obtains better results when it combines with other measures such as new regulations, upgrading of the road network, and reinforced police checks among others and in these cases, the measures were mutually reinforcing. In addition, the Commission noted that communication must never be an alibi or a pretext for not adopting other safety measures which could prove far more effective.

2.4.8 Effects of Different Types of Road Safety Education

School-Based Road Safety Education Programmes - Safety education for younger children targeted the use of bicycles, helmets and seat belts, and skills such as road crossing. Teens were targeted for driver education and responsible use of alcohol. Researchers (Lonero et al., 2007) agreed that classroom instruction was inferior to most other methods. At best, knowledge may be improved, but that change does not produce safer behaviour. In a U.S. study Lonero et al. pointed out that there was a lack of systematic analysis of the skills pedestrians need and a lack of understanding about how children view the traffic environment. They also talked about a number of studies that have been done on programmes that used play and simulation techniques to teach children an adult concept of speed, safe pedestrian habits and how to use crosswalks and all these programmes showed positive lasting effects. School-based helmet promotion programmes in Australia and New Zealand were successful in significantly increasing helmet wearing amongst children. The programmes incorporated road safety into the daily curriculum for two weeks. This was complemented with a bicycle inspection, discount vouchers for helmet purchase and spot prizes for helmet use. After several months the rate of use increased further and this may have been due to changes in the social acceptability of helmet-wearing. Traditionally, education programmes about seat belt use and child restraint have targeted parents. Bowman, Sanson-Fisher and Webb (1987) cited by Lonero et al. (2007) developed a pre-school programme aimed at children. It taught children to be conscious of wearing their restraints and to insist on wearing them while travelling in the car. It was successful in raising use rates from a baseline of 61 percent to 74 percent. High participation programmes aimed at raising belt use rates in slightly older children were also successful. The conclusion was that the potential for these kinds of programmes was significant and under-utilized.

Public Education and Information on Road Safety - Wilde (1991) produced an overview of the impact of mass media on health and safety behaviours. He started with the realization that changes in knowledge and attitude do not necessarily lead to changes in behaviour, and he concluded that, while the media influence what issues people think about, people's behaviour is more influenced by appropriate facts, in other words, the media should be more informative. Wilde also emphasized that the more broadly the media inform people on an issue the more likely they will make sensible decisions. Experiments with how newspapers handle collision stories have supported Wilde's theories. Training and education may not be able to produce safer road users on their own because training and education have difficulty changing attitudes and behaviour, but social marketing concepts may offer a solution. A social marketing concept hypothesized by Dussault (1993) offered a model that integrated research Analysis, safety Products, Promotion, Legislation and Enforcement (APPLE). It stressed participation and involvement, with two-way communication between the target population and the intervention agent. One study to test this approach found that objective information on what drivers think about existing and future road safety measures should be made available to safety management on an ongoing basis.

Visual methods such as films and slides were found to have little impact on behaviour. But videos giving children feedback on their own behaviour had some positive effect. Preusser and Lund (1988) showed that a carefully targeted and intensively presented video feedback programme had positive effects on child pedestrians. Carefully designed educational materials, delivered through community channels, with enforcement as a prompt and a disincentive for non-compliance appeared to produce a moderately effective programme. Rothe and Cooper (1988) cited by Lonero et al. (2007) evaluated two public education campaigns on seat belt use

carried out in British Columbia in 1983 and 1987. The first programme aimed at increasing seat belt use. Community organizations and institutions were targeted. Education, persuasion and enforcement efforts ranged from group presentations to a television campaign, distribution of printed materials, a pilot taxicab project and a traffic safety newsletter. The result was a 12 percent increase in seat belt use by all occupants and a 13 percent increase in use by drivers. Those with the lowest use rate increased the most. The second campaign in 1987 used media and promotion rather than community organizations and focused on the risks attached to non-use of belts. Starting at a baseline rate of 78 percent, the study found significant increases. There was evidence to indicate that the increase was related to the level of police charges. The conclusion was that large scale promotion campaigns should carefully consider costs and benefits.

Community Road Safety Education Programmes - Broad-based road safety approaches with positive reinforcement and incentives were recommended by Lonero et al. (2007). However, they pointed out that the relative importance of skills, abilities, knowledge and motivation was controversial and there was a need to pin down questions about whom to educate, how to educate and to what end. A comprehensive community bicycle helmet programme in Seattle aimed to increase parents' awareness, promote use by children, and reduce financial barriers to helmet use. Television, radio and print were used to disseminate information. Pamphlets for physicians and health departments were distributed. A bicycle safety programme was implemented in elementary schools using posters, stickers and incentives, and discount coupons and donations helped reduce helmet cost. The campaign attempted to reach all income levels and the result was an increase in helmet use amongst school-age children.

Formal Driver Education Programme - The DeKalb Driver Education Project was the study of beginner driver education (DE). It was to provide improved training and well-controlled evaluation. It was viewed as an experiment to see whether or not driver education can reduce collisions. Students were assigned randomly to an improved curriculum, a minimum curriculum or no training at all. The improved curriculum was more intensive than standard DE programmes (Lonero et al. 2007). Those trained with the improved curriculum showed better on-road skills and lower collision rates per licensed driver during their first 6 months of driving. Collisions per driver were the same for the different groups after 6 months. Lund, Williams, and Zador (1986) re-analyzed the data from the DeKalb study and compared the results for the total group, not just those who became licensed. Students who took the improved DE course were significantly more likely to get a driver's license, be in collisions and have traffic violations than students who had not taken such a course. Students taking the minimal curriculum were also more likely to get their license but were not more likely to be in crashes or have violations. Lund et al. proposed that, until future research identifies more effective programmes, DE should be regarded as a method to teach basic driving skills only and not as a strategy to reduce collisions. Similar results were found in an evaluation of DE training programmes run by the Automobile Association in New Zealand. An evaluation using three different manuals and tests for new drivers, drivers renewing their licenses, and older drivers showed a reduction in collisions. There were also indications that programmes using peer influence were effective.

Lonero et al. (2007) provided guidelines on developing road safety education programmes. They said road safety providers must: try to create more than short-term knowledge gains; make sure media expenses are cost effective; target children for complete road user skills; integrate education into broader-based programming that uses a variety of methods such as social action,

support for legislation and enforcement, incentives and publicity campaigns; support community awareness of road safety and the development of local standards of behaviour; support the development of a more constructive role for the news media; redesign driver education to recognize the protracted process of learning to drive and the need to use Driver Education in conjunction with other motivational influences.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

This chapter covers the methodology used in this research. It discusses the research design, population, sample, sampling technique, data collection instruments, pre-test of the data collection instruments, data collection, method of data analysis and study area.

3.2 Research Design

The design adopted for the research was a survey using the descriptive and analytical method. The method was adopted because it enabled the researcher to systematically collect information on demographic characteristics, driving history and the challenges faced from a large number of commercial drivers in Ho Municipality. According to Denzin (1970), the descriptive and analytic survey requires systematic collection of information from populations through the use of interview, the self- administered questionnaire or observation methods.

A survey research was used to obtain information on the practices of the approaches (tools) used in an effort to change driver behaviour. According to Baumgartner, Strong and Hensley (2002), in survey research, information concerning opinions or practices is obtained from a sample of people, representing a population, through the use of interview or questionnaire techniques. This information provides the basis for making comparisons and determining trends, reveals current weakness and/or strengths in a given situation, and provides information for decision making.

3.3 The Population

The population for the study consisted of all the members of the Transport Unions - Ghana Private Road Transport Union (GPRTU), Metro Mass Transit (MMT), Progressive Transport Union (PROTOA) and Co-operative Transport Union (CO-OP) in Ho Municipality. They were

chosen because they were the key target of driver behaviour change tools. The study also captured staffs of the Volta Regional Motor Traffic and Transport Unit (MTTU) of the Ghana Police Service; Driver and Vehicle Licensing Authority (DVLA); National Road Safety Commission (NRSC). They were chosen because they were the tools used to enforce, regulates and educate commercial drivers on road traffic rules and regulations in order to change their behaviour. In all, 460 commercial drivers, 15 MTTU police, 10 staff of DVLA and 5 staff of NRSC formed the population for the study.

3.4 Sample

The sample used for the study was made up of 103 respondents which comprised ninety two (92) commercial drivers from the Transport Unions (GPRTU, PROTOA, CO-OP and MMT). The study also sampled the Volta Regional heads and frontline staffs of the following institutions/organizations: Police MTTU, 5 staffs, DVLA, 4 staffs, and NRSC, 2 staffs.

There were 460 accessible commercial drivers in Ho Municipality as indicated in the sampling frame below:

Table 3.1 Driver Unions and their Members

Transport Union	No. of Members
GPRTU	256
PROTOA	85
CO-OP	68
MMT	51
TOTAL	**460**

Source: Field Data, 2012

However, there were about fifty seven (57) commercial vehicles (both taxis and mini buses) that ply the roads in Ho Municipality that do not belong to any of the Transport Unions and were referred to as 'floating vehicles.'

3.5 Sampling Technique

A simple random sampling technique of the probability sampling method was used to select samples from each of the Transport Unions in the same proportion as they exist in the population. A fishbowl technique was used where the names of every member of each Transport Union were written on a piece of paper. The pieces of paper were placed in a container; the number of pieces of paper corresponding to the number of respondents needed in each sample was drawn from the container one at a time (Baumgartner, Strong & Hensley, 2002). For each of the Transport Unions, GPRTU, PROTOA, CO-OP and MMT 20 percent of the population was sampled. Random selection without replacement was used. This ensured that each commercial driver in the population had the same opportunity or percentage of chance to be selected.

Table 3.2 Driver Unions and the Population Sampled

Driver Union	Total Population	Sampled Population
GPRTU	256	51
PROTOA	85	17
CO-OP	68	14
MMT	51	10
Total	**460**	**92**

Source: Field Data, 2012

Purposive sampling technique of the non-probability sampling method was used to select samples from the frontline staffs of the Volta Regional Police MTTU, DVLA and NRSC. At each of these institutions, those staffs that were directly in-charge of the major tasks performed by the institutions were selected and interviewed because they possess the necessary information about their institutions and will be able to provide the data needed for the research (Fraenkel and Wallen, 2003).

Table 3.3 Institutions Involved in Changing Driver Behaviour

Institution	Total Population	Sampled Population
Police MTTU	15	5
DVLA	10	4
NRSC	5	2
Total	**30**	**11**

Source: Field Data, 2012

3.6 Data Collection Instruments

The instruments used for collecting data were interview guide, focus group discussion, in-depth interview, observation and document review. The study made use of interview schedule and focus group discussion which solicited information from the commercial drivers from the various Transport Unions. An interview schedule was used to collect information from majority (84.8 percent) of the commercial drivers and 15.2 percent was through focus group discussion. In-depth interview and direct observation was used to solicit information from the staffs of police MTTU, NRSC and DVLA and there was document review of Road Traffic Regulations.

Personal interview was conducted where the researcher met with the respondents and based on their conversation, the needed information was obtained. Structured interview technique was used where both closed and open-ended questions were asked and the respondents answered in their own words and provided all the relevant information as was necessary. Notes were taken during the interview. This method was chosen because it elicits more detailed responses and allow for the use of probing questions in response to unclear or incomplete answers. It also offered the researcher the opportunity to clear up misconceptions, and increase likelihood that the respondent will be more conscientious with the interviewer present.

Focus group discussion (FGD) was used to collect information from eight (8) commercial drivers (8.7 percent) on their demographic characteristics, driving history, how they assessed the tools used to change driver behaviour, and the challenges they faced as commercial drivers. The venue for the discussion was the lorry station on a Sunday morning when activities at the station were less busy. The discussion lasted for 45 minutes. Another focus group discussion was held with six (6) Transport Union leaders (6.5 percent) who are also commercial drivers. The purpose was to find out how they ensured safety of their members on the roads and the challenges they faced in ensuring safety of the commercial drivers. The venue for the discussion was one of the offices of the Transport Unions at the lorry station. The discussion lasted for 30 minutes. In the two FGDs, a discussion guide that listed the main themes of the research issues was used. The researcher acted as the moderator of the discussion and was assisted by a trained research assistant who captured the discussion in writing. FGDs allowed for a variety of views to emerge while group dynamics allowed for the stimulation of new perspectives.

An in-depth interview schedule was used to collect data from the sampled frontline staffs of the Volta Regional Police MTTU, and the NRSC. Personal interview was conducted where the researcher met with each of the sampled staffs of the MTTU, and NRSC and based on their conversation the needed information was obtained. Unstructured interview technique was used where open-ended questions were asked and the respondents answered in their own words and provided all the relevant information as was necessary. There researcher had a guide with possible questions, but was not tied to it. Notes were taken during the interview. This method was chosen because it offered the researcher the opportunity to clear up misconceptions, opportunity to follow up responses and increase likelihood that the respondent will be more conscientious with the interviewer present.

An in-depth interview schedule and direct observation methods of data collection were used when collecting data on how the DVLA license drivers, renew and upgrade licenses, examines vehicles before registration and renewal of roadworthy certificates. The researcher, after he was briefed on the requirements and procedures for licensing drivers, renewal and upgrading of licenses and of examination of vehicles before registration and renewal of roadworthy certificate by the vehicle examiner, was asked to observe the process and ask questions when necessary while vehicles were examined. The venue for the observation was the vehicle examination garage of the DVLA, Ho. The observation took one hour and five new vehicles were examined and registered and twelve commercial and private vehicles were examined and their roadworthy certificates renewed.

Document review of 'The Road Traffic Act, 2004, Act 683 was done to collect data on the rules and regulations that govern the behaviour of commercial drivers on the roads and how to ensure safety of all road users. The review also looked at the penalties for violating road safety regulations.

Three research assistants were recruited and trained in the administration of the interview schedule by the researcher. The interview was conducted in the local language "Ewe" but English and "Twi" were also used where the interviewee did not understand "Ewe"

3.7 Pre-test of Data Collection Instruments

To ensure that the sampling frame was representative of the target population and the respondents understand the questions so as to obtain valid and reliable information, the interview schedule was pre-tested on one staff each of the police MTTU, DVLA and NRSC who were not part of this study. The interview schedule for the commercial drivers was pre-tested on 20 commercial drivers in Tsito and Anyirawase which are located in Ho Municipality. A pre-test of

the in-depth interview for the Police MTTU, DVLA and NRSC was carried out on a staff each of those institutions. The responses obtained were coded and analyzed and they help to find out the ambiguities, poorly worded questions and questions that were not understood or unclear to the respondents. The pre-test helped in restructuring the instruments.

3.8 Data Collection

An introductory letter from the Institute of Continuing and Distance Education, University of Ghana was first sent to leaders of the various transport unions to be permitted to have an interview with their members. The researcher together with two trained assistants had a one-on-one interview with the commercial drivers to solicit information on their demographic characteristics, driving history and the challenges they face as commercial drivers. A date was also scheduled with the union leaders for focus group discussion with their members and another one with the union leaders.

The introductory letter from the Institute of Continuing and Distance Education was also sent to the regional heads of the police MTTU, DVLA and NRSC for a date to be scheduled for the interview with the heads and their frontline staffs. Because of the busy schedules of the heads of these institutions, interview dates had to be re-scheduled on several occasions.

3.9 Method of Data Analysis

The interview and focus group discussions with the commercial drivers and in-depth interview with the heads of the institutions and their frontline staffs generated both qualitative and quantitative data which were analyzed independently using a combination of quantitative and qualitative methodologies. The quantitative data were edited, coded, and the Statistical Package for Social Sciences (SPSS) was used for analysis. The qualitative data responses were obtained from both the interview with the commercial drivers and in-depth interview with heads of

institutions and their front line staffs. The responses were summarized, organized and interpreted. The responses were transcribed. Overall, frequency tables, percentages, cross-tabulations, chi-square analysis, symmetric measures, mean and standard deviation were used for the quantitative data while descriptive analyses were used for the qualitative data.

3.10 The Study Area

The study was conducted in Ho Municipality of the Volta Region. Ho Municipality was chosen because Ho Township is the commercial centre of the Ho Municipality and the epicenter of the Volta Region. The regional offices of the major road safety stakeholder institutions MTTU, DVLA and NRSC and the Transport Unions are all located in Ho Township from where road safety interventions were carried out. Even though road safety campaigns were sometimes organized in some districts and some communities in the Volta Region, most of the educational and training programmes were held in Ho Municipality.

Ho, the capital town of the Volta Region is a major destination for commercial drivers and passengers from the region and other parts of the country, even commercial drivers and passengers from the neighbouring countries such as Togo, Benin and Nigeria come to Ho to perform one activity or the other. Ho, also has the largest number of taxis and commercial vehicles in the Volta Region.

CHAPTER FOUR

PRESENTATION OF THE STUDY FINDINGS

4.1 Introduction

This chapter presents results obtained from the field. The results were presented in line with the objectives of the study. They were grouped under three main headings: The demographic characteristics of commercial drivers; the tools (approaches) used to change road safety behaviour of commercial drivers; and the challenges faced in application of behaviour change approaches in Ho Municipality.

SECTION A – Commercial Drivers' Response to Approaches to Changing Road Safety Behaviour

4.2 The Demographic Characteristics of Commercial Drivers

This section presents the demographic characteristics of commercial drivers who participated in this study. The demographics relate to age, educational background, mode of training, years of work experience as a driver, years of work experience as a commercial driver and regulation of commercial drivers. The study also collected information on how the commercial drivers assessed the approaches used to change driver behaviour and the challenges they faced as commercial drivers. The information obtained helped in assessing the performance of the approaches used to change driver behaviour.

4.2.1 Age of Respondents

All the respondents were male adults within the active productive age group of above 22 years to 64 years. The distribution also indicated that there were few people within the youngest age group of 15-24 years and the oldest group from 55-64 years respectively. Majority (69.6 per cent) of the respondents were in the very active age group of between 25 and 54. This gave an indication of a large proportion of the commercial driver population being within a responsible

age group who could accept and be able to practice good safety culture. There was a small proportion of 13.0 percent who were below 24 years of age in commercial vehicle operations as indicated in Table 4.1.

Table 4.1 The Age Distribution of Ho Commercial Drivers

Respondent's age	Frequency	Percent
15-24	12	13.0
25-34	28	30.4
35-44	20	21.8
45-54	16	17.4
55-64	16	17.4
Total	**92**	**100.0**

Source: Field Data, 2012

The data showed that the commercial driving profession was dominated (69.6 per cent) by persons in the active working ages (25 to 54 years). However, the percentage decreases as the commercial drivers grew older.

4.2.2 Educational Background

All the respondents were educated and met the stipulated minimum requirement of a Basic Education Certificate (B.E.C.E.) needed to acquire a license and it was believed that they had the ability to read, comprehend and write simple English language as set by the DVLA in 2008. The details were as indicated in Table 4.2:

Table 4.2 Educational Level of Ho Commercial Drivers

Educational level	Frequency	Percent
JHS	35	38.0
Middle	55	59.8
Secondary	2	2.2
Total	**92**	**100.0**

Source: Field Data, 2012

The highest educational level of the respondents was secondary school and this was attended by only 2.2 percent; the remaining 97.8 percent had basic education, either Middle or Junior High Schools. It could be deduced from the data that even though all the respondents were educated their educational level was very low.

Table 4.3 Cross Tabulation of Age by Level of Education of Commercial Drivers

Age	Educational level			Total
	JHS	Middle	Secondary	
15 – 24	12	-	-	12 (13.0%)
25 – 34	23	5	-	28 (30.4%)
35 – 44	-	18	2	20 (21.8%)
45 – 54	-	16	-	16 (17.4%)
55 – 65	-	16	-	16 (17.4%)
Total	**35 (38.0%)**	**55 (59.8%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The data showed that 38.0 percent of the respondents who were within the age range of 15 to 34 years had their education up to Junior High School (JHS) level, while 54.3 percent within the age range of 35 to 65 years attended middle school. The rest who attended school were within the age range of 35 to 44 years. This showed a very youthful group of drivers.

Table 4.4 Chi-Square Analysis of Level of Education by Age of Commercial Drivers

Level of education	Age			
	Chi-square	df	N	Probability value @0.05
Level of education	80.52	8	92	0.000

Source: Field Data, 2012. Asymp. sig. – (Asymptotic significant = Probability value @0.05)

Table 4.4 indicated a significant association between the age of the respondents and their level of education ($p<0.05$). The older commercial drivers attended middle school while the younger commercial drivers attended JHS.

Table 4.5 Symmetric Measures of Level of Education by Age of Commercial Drivers

Level of education	Age of commercial drivers			
	Pearson's R	Asymp. Std. error	Spearman correlation	Asymp. Std. error
Level of education	0.728	0.047	0.787	0.038

Source: Field Data, 2012 Asymp. Std. error (Asymptotic Standard error)

A further analysis with correlation from Table 4.5 showed a strong relation between age and level of education.

4.2.3 Driving History – Mode of Training

The study showed that with the exception of 7.6 percent of the respondents who learned driving through formalized means (established driving schools) the remaining 92.4 percent learned driving through various informal arrangements. Even 3.3 percent were self-taught without the assistance of any instructor. The details were as indicated in Table 4.6.

Table 4.6 Mode of Commercial Driver Training

Mode of training	Frequency	Percent
Driver apprentice	52	56.5
Fitter/mechanic	12	13.0
Family/friend	18	19.6
Self-taught	3	3.3
Driving School	7	7.6
Total	**92**	**100.0**

Source: Field Data, 2012

Training by this means was of serious safety threat as the master craftsmen themselves may not have gone through formalized training. They only provided their previous experiences to their trainees. Those drivers who were self-taught were also dangerous to other road users especially during the period of self-tuition when they joined other road users on the road without the assistance of an instructor.

Table 4.7 Cross Tabulation of Age by Mode of Commercial Driver Training

Age of respondent	Mode of training					Total
	Driver apprentice	Fitter / mechanic	Family / friends	Self taught	Driving school	
15 – 24	10	-	-	-	3	13 (14.1%)
25 – 34	16	-	7	3	1	27 (29.3%)
35 – 44	6	7	7	-	-	20 (21.8%)
45 – 54	8	3	2	-	3	16 (17.4%)
55 – 64	12	2	2	-	-	16 (17.4%)
Total	**52 (56.5%)**	**12 (13.0%)**	**18 (19.6%)**	**3 (3.3%)**	**7 (7.6%)**	**92 (100%)**

Source: Field Data, 2012

The majority (56.5 percent) of the respondents across all the age groups learned driving through driver apprenticeship, 39.2 percent between 35 to 44 years and 55 to 64 years trained mainly as a driver through various informal methods and it was only 7.6 percent from the age groups 15 to 34 and 45 to 54 learnt driving through formal means of driving school. This showed that informal system of training by a master craftsman was the major mode of training commercial drivers in Ho Municipality.

Table 4.8 Cross Tabulation of Educational Level by Mode of Commercial Driver Training

Educational level	Mode of training to become a driver					Total
	Driver apprentice	Fitter/ mechanic	Family / friends	Self taught	Driving school	
JHS	22 (23.9%)	-	6 (6.5%)	3 (3.3%)	4 (4.3%)	**35 (38.0%)**
Middle	28 (30.4%)	12 (13.0%)	12 (13.0%)	-	3 (3.3%)	**55 (59.8%)**
Secondary	2 (2.2%)	-	-	-	-	**2 (2.2%)**
Total	**52 (56.5%)**	**12 (13.0%)**	**18 (19.5%)**	**3 (3.3%)**	**7 (7.6%)**	**92 (100%)**

Source: Field Data, 2012

The majority of JHS (23.9 percent) and middle school (30.4 percent) graduates learned driving as a driver apprentice, but 19.5 percent of them learned driving from friends and family members. Of the total number of respondents, 7.6 percent who attended JHS and middle school went to driving school, and interestingly, 3.3 percent of the JHS graduates were self-taught. For those respondents who went to middle school, 13.0 percent were trained as auto mechanics (fitters) but ended up as commercial drivers.

Table 4.9 Chi-Square Analysis of Demographic Characteristics by Mode of Training of Commercial Drivers

Demographic characteristics	Mode of training			
	Chi-square	df	N	Probability value @0.05
Age	40.854	16	92	0.001
Level of education	16.145	8	92	0.040

Source: Field Data, 2012

Table 4.9 indicated a significant relationship between mode of training and age of commercial drivers ($p<0.05$). The younger commercial drivers mainly trained as driver apprentice to become commercial drivers, some were however, taught by family and a few also attended driving school. The older commercial drivers were trained through driver apprenticeship, but some of them also trained as auto mechanic and others trained by their family members. Even though there was an association between level of education and mode of commercial driver training ($p<0.05$), level of education did not influence very much how a commercial driver was trained.

Table 4.10 Symmetric Measures of Demographic Characteristic by Mode of Training of Commercial Drivers

Demographic characteristic	Mode of training			
	Pearson's R	Asymp. Std error	Spearman correlation	Asymp. Std error
Age	0.728	0.047	0.787	0.038
Level of education	- 0.103	0.105	- o.021	0.110

Source: Field Data, 2012

Table 4.10 showed a strong relationship between age and mode of commercial driver training. Younger commercial drivers trained through driver apprenticeship unlike the older drivers some of which trained as auto mechanic and some trained by their friends or family. However, there

was no proper relationship between level of education and mode of training of commercial drivers.

A commercial driver gave reasons why he did not attend driving school, as he explained: "*Drivers who go to driving school did not know how to drive well. They teach them for only six weeks, four weeks in the classroom and two weeks practical on the road and they got license. How can they drive well? As for me, I stayed with my master for three years and gained a lot of experience, I studied everything so if my car breaks down on the road I can repair it myself, unless it is a major fault before I go to a mechanic. Drivers who go to driving school cannot do anything when their vehicle breaks down on the road.*"

4.2.4 Driving History – Years of Work Experience as a Driver

The study revealed that 45.7 percent of the commercial drivers in Ho have been driving a motor vehicle from between 1 and 10 years; 45.6 percent between 11 to 25 years; and 8.7 percent have been driving for over 26 years. This is shown in Table 4.11.

Table 4.11 Number of Years Driving a Motor Vehicle

Years of driving	Frequency	Percent
1 - 5	11	12.0
6 - 10	31	33.7
11- 15	5	5.4
16 - 20	23	25.0
21 - 25	14	15.2
26 - 30	6	6.5
31 - 35	2	2.2
Total	**92**	**100.0**

Source: Field Data, 2012

The data showed that majority of the commercial drivers have been driving for a number of years which it was expected, will enable them gain some driving experiences to be able to overcome

skill deficits such as poor appreciation of their own abilities, hazard perception and mental models of driving.

Table 4.12 Cross Tabulation of Age by Years of Driving a Motor Vehicle

Age	Years of driving experience							Total
	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	
15 – 24	7	5	-	-	-	-	-	12 (13.0%)
25 – 34	4	20	2	2	-	-	-	28 (30.4%)
35 – 44	-	2	2	14	2	-	-	20 (21.8%)
45 – 54	-	4	-	5	6	1	-	16 (17.4%)
55 – 65	-	-	-	3	6	5	2	16 (17.4%)
Total	**11 (12.0%)**	**31 (33.7%)**	**4 (4.3%)**	**24 (26.1%)**	**14 (15.2%)**	**6 (6.5%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The data showed that many of the commercial drivers started driving at very young ages between 15 and 34 years and have been driving between 1 and 10 years. As they grow older, the number of years they drive increases and the experiences they gain were also expected to improve. Since driving experience influences driving style, the commercial drivers in Ho were expected to improve the way they drive.

Table 4.13 Cross Tabulation of Level of Education by Years of Driving a Motor Vehicle

Level of education	Number of years of driving experience							Total
	1 – 5	6 – 10	11 – 15	16 – 20	21 – 25	26 – 30	31 – 35	
JHS	11	24	-	-	-	-	-	**35 (38.0%)**
Middle	-	7	5	22	13	6	2	**55 (59.8%)**
Secondary	-	-	-	1	1	-	-	**2 (2.2%)**
Total	**11 (12.0%)**	**31 (33.7%)**	**5 (5.4%)**	**23 (25.0%)**	**14 (15.2%)**	**6 (6.5%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The majority of the respondents attended middle school (59.8 percent) and had been driving between 6 and 32 years. This might be so, as many people found it difficult, in about 20 years ago, to attend secondary school so engaged in learning trade such as driving. Those who attended JHS (38.0 percent) have been driving between 1 and 10 years. This implied that irrespective of the level of education, once you become a driver you continue to drive until you grow old and you only stop when you are not able to cope with the strenuous activities of the driving profession.

4.2.5 Driving History – Years of Work Experience as a Commercial Driver

The respondents have been driving as commercial drivers between 1 and 32 years. The mean period of driving as a commercial driver was 12.14 years with a standard deviation of 7.390. Some respondents said after they were issued with a driver's license, they drove for a period of two years before they applied for upgrading to become commercial drivers. Some, however, especially Taxi drivers, started as commercial drivers soon after obtaining the driver's license.

Table 4.14 No. of Years Driving as a Commercial Driver

Number of years as a commercial driver	Frequency	Percent
1 - 5	20	21.7
6 - 10	24	26.1
11 - 15	14	15.2
16 - 20	24	26.1
21 - 25	7	7.6
26 - 30	1	1.1
31 – 35	2	2.2
Total	**92**	**100.0**

Source: Field Data, 2012

About 78.3 per cent of the respondents had over six (6) years experience in the commercial driving profession. This should ideally give some positive indication for safety issues on the

assumption that better skills and improved performance have been acquired from the years of experience. Some of the respondents have been driving private motor vehicle for a number of years before they started driving commercial vehicles.

Table 4.15 Cross Tabulation of Years of Driving Experience by Years of Driving as a Commercial Driver

Years of driving	Years of commercial driving experience							Total
	1-5	6-10	11-15	16-20	21-25	26-30	31-35	
1-5	11	-	-	-	-	-	-	**11 (12.0%)**
6-10	9	22	-	-	-	-	-	**31 (33.7%)**
11-15	-	2	2	-	-	-	-	**4 (4.3%)**
16-20	-	-	10	14	-	-	-	**24 (26.1%)**
21-25	-	-	2	7	5	-	-	**14 (15.2%)**
26-30	-	-	-	3	2	1	-	**6 (6.5%)**
31-35	-	-	-	-	-	-	2	**2 (2.2%)**
Total	**20 (21.8%)**	**24 (26.1%)**	**14 (15.2%0**	**24 (26.1%)**	**7 (7.6%)**	**1 (1.0%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The respondents (48.9 percent) who have been driving between 16 and 30 years have been in the commercial business between 11 and 25years while 45.7 percent of the respondents started driving commercial vehicles after obtaining their driving license.

Table 4.16 Chi-Square Analysis of Driving History by Age of Respondents

Driving history	Age of respondents			
	Chi-square	df	N	Probability value @0.05
- Years of driving	120.52	24	92	0.000
- Years as commercial driver	116.15	24	92	0.000

Source: Field Data, 2012

Table 4.16 showed a strong association between age and driving history ($p<0.05$). The longer the respondent had been driving a motor vehicle, the longer he also operated as a commercial driver.

Table 4.17 Symmetric Measures of Driving History by Age of Respondents

Driving history	Age of respondents			
	Pearson's R	**Asymp. std. error**	**Spearman correlation**	**Asymp. std. error**
- Years of driving	0.822	0.035	0.831	0.036
- Years as commercial driver	0.829	0.027	0.847	0.030

Source: Field Data, 2012

The Table 4.17 above showed that there were strong relationship between age and years of driving experience and years of experience as a commercial driver. The older the respondents, the longer the number of years he drove and the longer he operated as a commercial driver.

4.2.6 Driving History - Regulation of Commercial Drivers

All the respondents said they were having a driver's license. This could be said to be encouraging in terms of quantity. But there was no verification to find out whether the license they claimed to have was appropriate for the vehicle they were driving or if it was valid, fake or expired.

Table 4.18 Regulation of Commercial Drivers

Regulation of commercial drivers	**Licensing**	**License renewal**	**License upgrading**	**Road certificate renewal**
DVLA	85 (92.4%)	92(100.0%)	88 (95.7%)	80 (87.0%)
Agent/Master	7 (7.6%)	-	4 (4.3%)	12 (13.0%)
TOTAL	**92 (100.0%)**	**92(100.0%)**	**92(100.0%)**	**92(100.0%)**

Source: Field Data, 2012

In all, 92.4 percent of the respondents made a claim of having obtained their licenses from and renewed their licenses at the DVLA, 95.7 percent and 87.0 percent respectively upgraded and renewed their roadworthy certificate at the DVLA office. However, 7.6 percent, 4.3 percent and

13 percent respectively obtained their licenses, upgraded and renewed their roadworthy certificate through an agent. These percentages, even though seemed very small, have some safety implications, as there may be many more of them in the Municipality who have not been identified in the study. The respondents who obtained and upgraded their license or renewed their roadworthy certificate through an agent did not pass through the appropriate procedure and could be potential dangers to other road users.

Table 4.19 Cross Tabulation of Age and How License was obtained

Age	How license was obtained		Total
	DVLA	Master	
15-24	12 (13.0%)	-	12 (13.0%)
25-34	27 (29.4%)	1 (1.1%)	28 (30.4%)
35-44	14 (15.2%)	6 (6.5%)	20 (21.8%)
45-54	16 (17.4%)	-	16 (17.4%)
55-64	16 (17.4%)	-	16 (17.4%)
Total	**85 (92.4%)**	**7 (7.6%)**	**92 (100.0%)**

Source: Field Data, 2012

The majority (92.4 percent) of the commercial drivers across all the age groups said they obtained their license from the DVLA. It was only 7.6 percent of the respondents who obtained their license through an agent. These categories of drivers did not go through eye test, written driving test, road signs test and in-traffic test; as a result, there were a threat to other road users.

Table 4.20 Cross Tabulation of Educational Level and how License was obtained

Educational level of commercial drivers	How license was obtained		Total
	DVLA	Master	
JHS	34 (36.9%)	1 (1.1%)	35 (38.0%)
Middle	49 (53.3%)	6 (6.5%)	55 (59.8%)
Secondary	2 (2.2%)	-	2 (2.2%)
Total	**85 (92.4%)**	**7 (7.6%)**	**92 (100%)**

Source: Field Data, 2012

All the respondents had some level of education which qualified them to apply for driving license themselves, but 7.6 percent of the respondents who attended JHS and Middle school sought the assistance of agents in obtaining their license.

Table 4.21 Chi-Square Analysis of Age by Regulation of Commercial Drivers

Regulation of commercial drivers	Age of respondents			
	Chi-square	**df**	**N**	**Probability value @0.05**
- Obtaining license	18.537	4	92	0.001
- License upgrading	3.640	4	92	0.457
- Renewal of roadworthy certificate	1.958	4	92	0.743

Source: Field Data, 2012

Table 4.21 indicated a strong association between age and mode of obtaining license ($p<0.05$). Majority of the respondents across all the age groups obtained their license from the DVLA. However, there was no association between age and renewal of roadworthy certificate and license upgrading.

Table 4.22 Symmetric Measures of Age by Regulation of Commercial Drivers

Regulation of commercial drivers	Age of respondents			
	Pearson's R	**Asymp. std. error**	**Spearman correlation**	**Asymp. std. error**
- Obtaining license	-0.022	0.04	0.006	0.054
- License upgrading	0.004	0.011	0.016	0.019
- Renewal of roadworthy certificate	0.034	0.069	0.029	0.074

Source: Field Data, 2012

Table 4.22 indicated a minimal negative correlation between age and mode of obtaining driving license. There were no consistent relationship between upgrading of license and renewal of roadworthy certificate.

As explained by a commercial driver: *"I applied for a drivers license, was tested and paid the prescribed fees at the DVLA office and they issued me with a cover note and later a driving license which I used for two years. When I went for the license to be renewed after two years it was found to be fake. I question them about how a license issued by their office could be fake? Nobody was able to give me any tangible explanation, even upon showing them evidence of my test and receipts. I had no choice but to go through the process again to acquire a new driver's license."*

It could be inferred that there were some officials of the DVLA who have accomplices who were involved in duping unsuspecting driving license applicants and some commercial drivers by collecting money from them and issuing them with fake driving licenses and roadworthy certificates purported to be coming from the DVLA office.

4.3 The Perception of Commercial Drivers about approaches to Changing Driver Behaviour

The knowledge and opinions of the commercial drivers were sought about the approaches used to change driver behaviour – legislation, enforcement, reinforcement and education since they were the key target of these approaches.

4.3.1 Legislation

Most of the respondents when asked to mention road traffic rules and regulations were able to mention only few of them. These were shown in the Table 17 below:

Table 4.23 Knowledge of Commercial Drivers on Road Traffic Rules and Regulations

Road traffic regulations	Knowledge of commercial drivers		Total
	Yes	No	
Drunk driving	62 (67.4%)	30	92
Overloading	62 (67.4%)	30	92
Over-speeding	56 (60.9%)	36	92
Vehicle maintenance	64 (69.6%)	28	92
Seat belt use	21 (22.8%)	71	92
Wrong overtaking	50 (54.3%)	42	92
Road signs and markings	46 (50.0%)	46	92
Mobile phone use	14 (15.2%)	78	92
Valid license	10 (10.9%)	82	92
Overloading	45 (48.9%)	47	92
Valid documents (insurance, road certificate)	15 (16.3%)	77	92
No idea	8 (8.7%)	84	92

Source: Field Data, 2012

The road traffic regulations which the majority of the respondents were familiar with were rules on maintenance of vehicle (69.6 percent), over-speeding (60.9 percent), drunk driving and overloading (67.4 percent), wrong over taking (54.3 percent), and road signs and markings (50.0 per cent). There were rules on seatbelt and mobile phone use while driving, but since they were not strictly being enforced by the police MTTU, only few respondents (22.8 percent and 15.2 percent respectively were knowledgeable on them. Also, there were rules on driving without valid driver's license and valid vehicle documents and these were the main target of police enforcement on road checks, but only 10.9 percent and 16.3 percent respectively of the respondents had knowledge on them. Interestingly, 8.7 percent of the respondents had no knowledge at all about road traffic rules and regulations.

Table 4.24 Cross Tabulation of Mode of Training and Knowledge on Road Traffic Regulations

Mode of training	Knowledge on a number of road traffic regulations								Total
	No idea	1	2	3	4	5	6	7	
Driver apprentice	5	-	3	5	10	18	11	-	**52 (56.5%)**
Fitter/ mechanic	3	1	-	2	4	1	1	-	**12 (13.0%)**
Family/ friend	-	-	-	-	2	9	6	1	**18 (19.6%)**
Self taught	-	-	-	-	-	-	3	-	**3 (3.3%)**
Driving school	-	-	-	-	3	2	2	-	**7 (7.6%)**
Total	**8 (8.7%)**	**1 (1.1%)**	**3 (3.3%)**	**7 (7.6%)**	**19 (20.6%)**	**30 (32.6%)**	**23 (25.0%)**	**1 (1.1%)**	**92 (100.0%)**

Source: Field Data

The driver apprenticeships (56.5 percent) were more knowledgeable on road traffic regulations than those who learned driving from family or friends, mechanics and self-taught. The majority (78.2 percent) of the respondents had knowledge on four to six road traffic regulations, and only 1.1 percent had knowledge on more than 7 road traffic regulations and but 8.7 percent of driver apprentices and mechanics had no knowledge on road traffic rules and regulations at all. Meanwhile, the regulations in the Road Traffic Act 683 and other Legislative Instruments on road traffic yielded more that 300 traffic offences.

Table 4.25 Cross Tabulation of Driver Education/Training by Knowledge on Road Traffic Regulations

Driver education/ training	Knowledge on road traffic regulations								Total
	No idea	1	2	3	4	5	6	7	
No training	8	-	3	4	11	13	13	-	**52 (56.5%)**
Training	-	1	-	3	8	17	10	1	**40 (43.5%)**
Total	**8 (8.7%)**	**1 (1.1%)**	**3 (3.3%)**	**7 (7.6%)**	**19 (20.6%)**	**30 (32.6%)**	**23 (25.0%)**	**1 (1.1%)**	**92 (100.0%)**

Source: Field Data

The respondents who have had no driver education or training, 47.8 percent were knowledgeable on between two and six road traffic regulations as against 41.3 percent of those who have had some driver education or training. Also, 8.7 percent of the respondents who have not attended any driver education or training had no knowledge at all on road traffic regulations.

Table 4.26: Chi-Square Analysis of Driving History by Knowledge on Road Traffic Rules

Driving history	Knowledge of road traffic rules			
	Chi-square	df	N	Probability value @0.05
Mode of training	40.521	28	92	0.059
Driver education/training	13.201	7	92	0.067

Source: Field Data, 2012

The result from Table 4.26 showed that there was no association between driving history and knowledge on road traffic regulations ($p>0.05$). The mode of training to become a driver and attendance of driver education or training did not increase the knowledge of commercial drivers on road traffic regulations.

Table 4.27 Symmetric Measures of Driving History by Knowledge of Road Traffic Rules

Driving history	Knowledge of road traffic rules			
	Pearson's R	Asymp.std. error	Spearman correlation	Asymp.std. error
Mode of training	0.241	0.068	0.223	0.098
Driver education/training	0.260	0.081	0.196	0.099

Source: Field Data, 2012

There was a weak relationship between driving history and knowledge of road traffic regulations, this implied that the mode of training and attendance of driver training and education do not necessarily improve the knowledge of the commercial drivers on road traffic regulations.

4.3.2 Enforcement and Regulation of Road Traffic Rules

The enforcement and regulations of road traffic rules by the Police MTTU and DVLA were rated by the commercial drivers. The commercial drivers acknowledge the Police MTTU existed to ensure safety on the roads by checking over-speeding, overloading, driving license, vehicle insurance and roadworthy certificate and also to control traffic in towns at road intersections to allow free flow of traffic. These ratings were shown in Table 4.28.

Table 4.28 The Perception of Commercial Drivers on Enforcement and Regulation of Road Traffic Rules

Enforcement and regulation of road traffic rules	Perception of commercial drivers				Total
	No response	Very effective	Effective	Not effective	
Police MTTU	11 (11.9%)	18 (19.6%)	61 (66.3%)	2 (2.2%)	92 (100%)
DVLA	14 (15.2%)	33 (35.9%)	42 (45.6%)	3 (3.3%)	92 (100%)

Source: Field Data

The enforcement of road traffic rules by the police MTTU was seen by 66.3 percent of the respondents to be effective while 45.6 percent rated the regulation of road traffic rules by the DVLA as effective. Even though a few respondents (2.2 percent and 3.3 percent) saw the police MTTU and DVLA respectively not to be effective, 11.9 percent and 15.2 percent were undecided on the performance of the police MTTU and the DVLA.

Table 4.29 Cross Tabulation of Age by Commercial Drivers' Perception of Police MTTU

Age	Perception of Police MTTU				Total
	No response	Very effective	Effective	Not effective	
15-24	2	1	9	-	12 (13.0%)
25-34	1	7	20	-	28 (30.4%)
35-44	-	3	15	2	20 (21.8%)
45-54	7	-	9	-	16 (17.4%)
55-64	1	7	8	-	16 (17.4%)
Total	**11 (11.9%)**	**18 (19.6%)**	**61 (66.3%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The respondents across all the age groups (66.3%) agreed that the police MTTU was effective in enforcing road traffic rules, 19.6 percent thought they were very effective, but 14.1 percent were either undecided or thought the police MTTU were not effective.

Table 4.30 Cross Tabulation of Level of Education by Commercial Drivers' Perception of Police MTTU

Level of education	Perception of Police MTTU				Total
	No response	Very effective	Effective	Not effective	
JHS	3	7	25	-	35 (38.0%)
Middle	8	11	34	2	55 (59.8%)
Secondary	-	-	2	-	2 (2.2%)
Total	**11 (11.9%)**	**18 (19.6%)**	**61 (66.3%)**	**2 (2.2%)**	**92 (100.0%)**

Source: Field Data, 2012

The respondents across all levels of education (66.3 percent) said the police MTTU was effective in enforcing road traffic regulations,19.6 percent saw them to be very effective and 14.1 percent were undecided or thought they were not effective.

Table 4.31 Chi-Square Analysis of Demographic Characteristics by Commercial Drivers' Perception of Police MTTU

Demographic Characteristics	Perception of Police MTTU			
	Chi-square	df	N	Probability value @0.05
Age	36.107	12	92	0.000
Level of education	3.276	6	92	0.773

Source: Field Data, 2012

Table 4.31 showed a significant difference between the age of respondents and their perception of the police MTTU ($p<0.05$). The majority of the respondents across all the age groups saw the Police MTTU to be effective in enforcing road traffic regulations. There was no relationship however, between level of education and perception of the police MTTU in enforcing road traffic regulations ($p>0.05$).

Table 4.32 Symmetric Measures of Demographic Characteristics by Commercial Drivers' Perception of Police MTTU

Demographic Characteristics	Perception of Police MTTU			
	Pearson's R	Asymp. std. error	Spearman correlation	Asymp. std. error
Age	- 0.169	0.101	- 0.162	0.104
Level of education	- 0.018	0.094	- 0. 016	0.098

Source: field data, 2012

The data from the table showed that there was no proper relationship between the demographic characteristics of the respondents in their perception of Police MTTU. Age and level of education did not have anything to do with how the respondents perceived the performance of the police MTTU.

Table 4.33 Chi-Square Analysis of Driving History by Commercial Drivers' Perception of Police MTTU

Driving history	Perception of Police MTTU			
	Chi-square	df	N	Probability value @0.05
Mode of training	41.908	12	92	0.000
Years of commercial driving	24.289	18	92	0.146

Source: Field Data, 2012

Table 4.35 indicated a significant difference between mode of training and perception of the police MTTU ($p<0.05$). However, there was no relationship between years of commercial driving and perception of the police MTTU ($p>0.05$).

Table 4.34 Symmetric Measures of Driving History by Commercial Drivers' Perception of Police MTTU

Driving history	Perception of Police MTTU			
	Pearson's R	Asymp. std. error	Spearman correlation	Asymp. std. error
Mode of training	- 0.235	0.120	- 0.151	0.110
Years of commercial driving	- 0.054	0.099	- 0. 038	0.105

Source: Field data, 2012

The data from the table showed that there was a weak relationship between driving history of commercial drivers in their perception of Police MTTU. The mode of training and years of commercial driving did not influence how the respondents perceived the performance of the police MTTU.

In general, the respondents perceived the police MTTU to be effective in enforcing road traffic rules and regulations. The respondents who said the police MTTU was ineffective gave the following comments: A commercial driver stated thus: *"The Police MTTU on the roads collected money from us, whether we commit an offence or not, it was a regular practice, once a*

Police officer stops you, you have to put "something' in the document for them, otherwise they will delay your time." Another commercial driver explained further that: *"Police on road checks only collect money from drivers without inspecting the vehicle to check for overloading, use of worn out tyres and expired vehicle documents or license. This attitude of the police encouraged some commercial drivers to put up unsafe behaviours on the roads such as overloading, driving without license or use of expired license and vehicle documents such as insurance and roadworthy certificates."* This was an observation made by another commercial driver: *"The police on the roads do not normally check private and government vehicles which could also pose safety problems; they concentrated only on commercial vehicles and sometimes chased them which could result in an accident. Also, the Police patrol team only patrolled in towns in the night and chased cargo vehicles and collected money from them instead of being on the roads at places known for armed robbery operations to ensure safety of vehicles and their occupants."*

The Police arrested commercial drivers who violate road safety rules. Some road traffic offenders according to the commercial drivers were made to pay on the spot fines; some were arrested and prosecuted at the law court. This was what commercial drivers who perceived the police MTTU to be effective had to say: *"When a Police arrest and send you to court for violating some road traffic rule, what annoys me is that the judge will not listen to the side of the story from the commercial driver but only takes what the police officer wrote on the charge sheet and will just either remand, fine or sentence you to prison term. In order to avoid this, when Police arrest me for violating road traffic offence I give money to the police officer to be set free. Also, what I give to the Police is far lower than what I will pay at the court when fined."* Other

commercial drivers who perceived the police MTTU to be effective also affirmed that bribing saved them time with the police and the courts.

The role of regulatory and enforcement of driver and vehicle safety by the DVLA was rated by the commercial drivers.

Table 4.35 Cross Tabulation of Age by Commercial Drivers' Perception of DVLA

Age	Perception of DVLA				Total
	No response	Very effective	Effective	Not effective	
15-24	3	4	4	1	12 (13.0%)
25-34	2	12	14	-	28 (30.4%)
35-44	1	4	13	2	20 (21.8%)
45-54	8	3	5	-	16 (17.4%)
55-64	-	10	6	-	16 (17.4%)
Total	**14 (15.2%)**	**33 (35.9%)**	**42 (45.6%)**	**3 (3.3%)**	**92 (100.0%)**

Source: Field Data, 2012

As many as 35.9 percent of the respondents across the age groups saw the DVLA to be very effective and 45.6 percent thought they were effective in regulating road traffic rules, but 18.5 percent said they were either not effective or undecided on the performance of the DVLA.

Table 4.36 Chi-Square Analysis of Demographic Characteristics and Driving History by Commercial Drivers' Perception of DVLA

Demographic characteristics and driving history	Perception of DVLA			
	Chi-square	df	N	Probability value @0.05
Age	33.563	12	92	0.001
Level of education	3.883	6	92	0.692
Mode of training	25.568	12	92	0.012
Years of commercial driving	13.476	18	92	0.763

Source: Field Data, 2012

There was a significant difference between age and mode of training of the respondents and their perception of the DVLA ($p<0.05$). The younger respondents perceived the DVLA to be effective while the older respondents who have had more contacts with the DVLA found them very effective. The respondents who trained as driver apprentice saw the DVLA to be very effective compared to those who trained through other informal sources of training to become a driver.

However, there was no significant difference between level of education and years of operating as a commercial driver and their perception of the DVLA ($p>0.05$). The respondents' perception of the DVLA was the same irrespective of their level of education and the number of years they have been operation as a commercial driver.

Table 4.37 Symmetric Measure of Demographic Characteristics and Driving History by Commercial Drivers' Perception of DVLA

Driving history and driving history	Perception of DVLA			
	Pearson's R	Asymp. std. error	Spearman correlation	Asymp. std. error
Age	- 0.081	0.099	- 0.073	0.104
Level of education	- 0.022	0.097	- 0.017	0.101
Mode of training	0.048	0.115	0.082	0.106
Years of commercial driving	- 0.053	0.094	- 0.066	0.101

Source: Field Data, 2012.

There were strong negative relationship between age and their perception of DVLA. The younger respondents perceived the DVLA to be effective while the older respondents found them very effective in regulation road traffic rules. There was also a weak negative relationship between level of education and years of commercial driving by the respondents but positive relationship between mode of training and perception of DVLA by commercial drivers.

Commercial drivers who saw the DVLA to be ineffective expressed their opinions as follows:

- *"As for the DVLA, the amount of money you pay is always different from the amount they write on the official receipt, every officer you go to they will collect money from you before processing your document."*

- *"Some DVLA officials collected money from failed driving license applicants and passed them and some also collected money from commercial drivers and process their documents for them. These sometimes resulted in the issue of fake driving license or other fake vehicle documents."*

- *"There are some 'middlemen' at DVLA office who coerce drivers and extort money from them and sometimes give them fake documents. Some will get you the proper document at an increased rate."*

4.3.3 Motivation of Commercial Drivers - Reinforcement and Driver Education/Training

An appropriate driver reward scheme would motivate commercial drivers to the desired level of safe driving performance. However, there seemed to be no means of reinforcing (reward, incentive) commercial drivers, indication from the data showed that 87.0 percent of the commercial drivers have not had any incentive or reward since they started driving, whether from their union leaders, their vehicle owners or government. Only 13.0 percent were at the end of the year given rewards or incentives as a form of motivation by their union leaders. These are indicated in Table 4.42.

Table 4.38 Motivation of Commercial Drivers - Reinforcement and Driver Education/Training

Motivation of commercial drivers	Commercial driver's response		Total
	Yes	No	
Reinforcement (incentives, rewards)	12 (13.0%)	80 (87.0%)	92 (100%)
Driver education/training	40 (43.5%)	52 (56.5%)	92 (100%)

Source: Field Data, 2012

The rewards or incentives were in the form of money, a piece of cloth or a bag of rice provided by transport unions to their drivers; the NRSC provided annual award to the best performing transport unions and companies; NRSC in collaboration with some insurance companies seldom provided best driver award to commercial drivers; NRSC organized quiz competition for transport unions and companies and drivers of the winning team were sponsored to attend driver training in Accra as a form of motivation.

The data showed that only 43.5 percent of the respondents attended driver education/training and 56.5 percent have not attended any driver education/training since they started driving.

Table 4.39 Cross Tabulation of Reinforcement by Driver Education/Training

Reinforcement	Driver education/training		Total
	No education/training	Education/training	
Not rewarded	41 (44.6%)	39 (42.4%)	80 (87.0%)
Rewarded	11 (11.9%)	1 (1.1%)	12 (13.0%)
Total	**52 (56.5%)**	**40 (43.5%)**	**92 (100.0%)**

Source: Field Data

Of the 56.5 percent of the respondents who have not attended any driver education or training, majority (44.6 percent) have also not received any reward since they started driving. Those

respondents who attended driver education/training, majority (42.4 percent) have also not had any reward.

Table 4.40 Chi-Square Analysis of Reinforcement by Driver Education/Training

Reinforcement	Driver education/training			
	Chi-square	df	N	Probability value @ 0.05
Reward or no reward	6.936	1	92	0.008

Source: Field Data, 2012

Table 4.40 indicated an association between reinforcement and driver education/training ($p<0.05$). The respondents who were not rewarded decided on their own volition whether to attend driver education/training. The respondents who were rewarded, the reward did not motivate them to attend driver education/training. A further analysis with correlation revealed the following results.

Table 4.41 Symmetric Measure Reinforcement by Driver Education/Training

Reinforcement	Driver education/training			
	Pearson's R	Asymp. std. error	Spearman correlation	Asymp. std. error
Reward or no reward	- 0.275	0.073	- 0.275	0.073

Source: Field Data, 2012

The analysis in Table 4.41 showed a weak negative relationship between reinforcement and driver education/training. The respondents who were rewarded fail to attend driver education/training to improve their knowledge and skills.

4.3.4 Effects of Reinforcement on Behaviour of Commercial Drivers

The respondents who have not had any incentive or reward had this to say:

"There are no award programmes organized for individual commercial drivers, whenever there is an award programme, it is for the Transport Unions and the leaders are those who benefit."

"There is no ranking in commercial driving, all commercial drivers are equal irrespective of the number of years you have been driving; the number of years of driving without accident; your educational level; or age , we are all equal".

"Even though I have not been rewarded before, I still do what is good to avoid accident and keep the road safe."

The respondents who had a reward or an incentive said the following: *"The reward encouraged me to drive more carefully because I have noticed that my effort was appreciated." "The award gave me hope that I was counted among the best drivers in the Ho Municipality*.

Table 4.42 Cross Tabulation of Age by Attendance of Driver Education/Training

Age	Driver education / training		Total
	No training	Training	
15 – 24	12 (13.0%)	-	12 (13.0%)
25 – 34	20 (21.8%)	8 (8.7%)	28 (30.4%)
35 – 44	10 (10.9%)	10 (10.9%)	20 (21.8%)
45 – 54	4 (4.3%)	12 (13.0%)	16 (17.4%)
55 – 64	6 (6.5%)	10(10.9%)	16 (17.4%)
Total	**52 (56.5%)**	**40(43.5%)**	**92 (100%)**

Source: Field Data, 2012

The respondents between ages 15 and 34 years, 34.8 percent did not attend any driver education/training, only 8.7 percent attended driver education and training. Also, 34.8 percent of

the respondents who attended driver education/training were between ages 35 and 64 years. A further analysis to establish a clear relationship between the two variables revealed the data in Table 4.43.

Table 4.43 Cross Tabulation of Level of Education by Attendance of Driver Education/Training

Level of education	Driver education / training		Total
	No training	Training	
JHS	32 (34.7%)	3 (3.3%)	**35 (38.0%)**
Middle	18 (19.6%)	37 (40.2%)	**55 (59.8%)**
Secondary	2 (2.2%)	-	**2 (2.2%)**
Total	**52 (56.5%)**	**40 (43.5%)**	**92 (100%)**

Source: Field Data, 2012

Table 4.43 showed that of those who attended driver education/training, many of them (40.2 percent) were persons with middle school leaving certificates while the rest were disinterested in the training.

Table 4.44 Cross Tabulation of Mode of Training by Attendance of Driver Education/Training

Mode of training	Driver education / training		Total
	No training	Training	
Driver apprentice	30 (32.6%)	22 (23.9%)	**52 (56.5%)**
Fitter	6 (6.5%)	6 (6.5%)	**12 (13.0%)**
Family	9 (9.8%)	9 (9.8%)	**18 (19.6%)**
Self	3 (3.3%)	-	**3 (3.3%)**
Driving School	4 (4.3%)	3(3.3%)	**7 (7.6%)**
Total	**52 (56.5%)**	**40 (43.5%)**	**92 (100%)**

Source: Field Data, 2012

The data showed that 32.6 percent of the respondents who trained as driver apprentice and 23.9 percent of the respondents who trained through other means had not attended any driver education/training since they started driving.

4.3.5 Effects of Education and Training on Behaviour of Commercial Drivers

The explanations given by respondents who have not attended any driver education or training were as follows:

"I know how to drive and I can study a new model of any vehicle and drive, and since driver education or training is not compulsory, I see no reason why I should waste my time and attend any of them."

"I learn during my normal commercial driving so there is no need for any other education or training, after all, what different thing are they going to teach apart from how to drive?"

"Our union leaders do not organize any education and training for us".

However, 23.9 percent of the respondents who trained as driver apprentice and 19.6 percent who trained through other modes went through driver education/training. The respondents who attended driver education/training programmes made the following comments:

"The training programme made me to be attentive and cautious and these had paid off because I was not involved in any accident since I started driving."

"I used to over-speed and did not respect road signs but now I have changed after the education and training programme";

"Education and training reminds me of road safety rules and regulations."

A further analysis to establish a clear relationship between the demographic characteristics and mode of training by driver education/training revealed the data in Table 4.45.

Table 4.45 Chi-Square Analysis of Demographic Characteristics and Mode of Training by Driver Education/Training

Demographic characteristics and mode of training	Driver education/training			
	Chi-square	Degree of freedom	N	Probability value @ 0.05
Age	20.934	4	92	0.000
Level of education	31.564	2	92	0.000
Mode of training	2.934	4	92	0.569

Source: Field Data, 2012

Table 4.45 indicated a significant difference between demographic characteristics and driver education/training ($p<0.05$). The younger respondents who were JHS graduates did not attend any driver education/training but majority of the older respondents who attended middle school had attended driver education/training over the years. However, there was no significant difference between mode of training and attendance of driver education/training ($p>0.05$). The mode of training did not influence the attendance of driver education/training.

Table 4.46 Symmetric Measures of Demographic Characteristics and Mode of Training by Driver Education/Training

Demographic characteristics and mode of training	Driver education/training			
	Pearson's R	Asymp. std. error	Spearman correlation	Asymp. std. error
Age	0.434	0.087	0.444	0.086
Level of education	0.476	0.094	0.507	0.087
Mode of training	- 0.008	0.104	0.013	0.104

Source: Field Data, 2012

There was a weak positive relationship between age and level of education and attendance of driver education/training. But there was no significant relationship between mode of training and attendance of driver education or training.

Table 4.47 Behaviours, Knowledge and Skills Targeted by Road Safety Education and Training

Road safety education and training	**Behaviours, knowledge and skills targeted**
Road safety education in basic schools	- Road and their uses - Safety on the roads - Safety on a bus - Road signs and markings - Crossing drill - Child safety in cars, "trotros" and buses
Targeted campaigns	- Exceeding speed limits in towns - Driving under the influence of alcohol and drugs - Driving tired (fatigue) - Seatbelt use and crash helmets
Community outreach	- Existing road traffic rules and regulations and legislative instruments on road safety - Consequences of disregarding traffic rules and regulations - Penalties for violation of traffic rules and regulations - Ways of preventing road traffic accidents
Commercial driver training	- Defensive driving - Driving under hazardous conditions - Observance of road signs and markings - Overloading of vehicles - Wrong overtaking - Respect for other road users
Information and publicity	- Causes of road traffic accidents - Effects of road traffic accidents - Prevention of road traffic accidents - Accident statistics

Source: Field Data, 2012

The education and training for the respondents were provided by NRSC in collaboration with either DVLA or Police MTTU or both of them and transport companies such as Metro Mass Transit, State Transport Corporation, Kingdom Transport Services, Lever Brothers Ghana Limited, Kumasi Metropolitan Assembly and Kumasi Technical Institute for their drivers.

4.4 Challenges Faced as a Commercial Driver

The challenges faced by commercial drivers in Ho Municipality were enumerated as expressed by the respondents:

4.4.1 Road condition

- *"The roads in the Municipality are bad and this causes damage to our vehicle parts and some results in accidents. Sometimes, in an attempt to dodge potholes can result in head-on collision or the vehicle veering off the road into a gutter. Also, the erection of numerous speed humps and ramble strips on the roads in the Municipality create inconvenience to us drivers and cause damage to their vehicle parts."*
- *"Road signs and markings are nonexistent on some of the roads in the Municipality and that could be a potential hazard to drivers, especially those who are not familiar with the road".*

4.4.2 Occupational Characteristics

- *"There are undefined conditions of service for the commercial drivers. There are no proper agreement between the commercial driver and his vehicle owner, as a result the commercial driver could be hired and fired at the discretion of the vehicle owner. The vehicle owner also decides how much to pay the driver and when to pay him. This made us to over-work ourselves, sometimes about twelve (12) hours or more in a day so that we*

can get enough money to pay for the daily sales, buy fuel and get something for our own upkeep."

- *"There is no retirement benefit or package for a commercial driver, a commercial driver drives to an old age and go home with what he has been able to acquire while driving."*
- *"As commercial drivers we are not on any salary scale (pay structure) and this serves as a disincentive for us attending driver education or training programmes to upgrade our knowledge and skills you will not be promoted as it is done in other professions."*
- *"Lack of maintenance of some commercial vehicles by the vehicle owners resulted in increased expenses during servicing, and some even resulted in accidents. Early identification and correction of minor faults before they develop into major defects is a key requirement for an effective vehicle maintenance programme."*

4.4.3 Educational Opportunities

- *"We the commercial drivers do not have professional education and training opportunities in Ho Municipality to upgrade our level of expertise and competence; this resulted in most commercial drivers in the Municipality being unable to cope with emerging situations and challenges on the roads."*
- *"There are no motivation (rewards or incentives) for commercial drivers. Motivational factors such as achievement, recognition, growth and advancement possibilities will inspire commercial drivers to drive safely; however, if unsafe working conditions are present there will be strong dissatisfaction among the commercial drivers concerning safety."*

4.4.4 Other road users

- *"Most pedestrians do not take any caution when walking on the roads, they also do not take care when crossing the roads and this sometimes results in pedestrian knockings."*
- *"A mistake or an action of an inexperienced driver could result in an experienced driver involving in an accident, especially driving in hazard conditions such as night driving or driving when it is raining."*
- *"The use of defective headlights or indicator lights by some drivers especially in the night, some vehicles had only one headlight working, some the headlights were not properly aimed while other drivers switched headlights to high beam when meeting another vehicle or when closely following another, these actions could blind the other driver and could result into an accident."*
- *"Some drivers overtake wrongly without making sure that the road was clear far ahead and behind. Some even overtake in a bend or at the brow of a hill. This could force some drivers to swerve or slow down to avoid an accident."*

4.4.5 Road Security

- *"When the police collect the license of a commercial driver for inspection and there is no money in it, they refuse to give the license back to the driver and this has resulted in a numbers of commercial drivers losing their licenses."*
- *"There were increasing numbers of armed robber attack on the roads in the night, especially for those who travel long distances. This resulted in loss of properties by the commercial drivers and their passengers, sometimes there were damage to the vehicle and injury of the driver or passengers and sometimes resulting in deaths."*

SECTION B – Institutional Response to Changing Driver Behaviour

4.5 The Aims and Objectives of Approaches to Changing Driver Behaviour

4.5.1 Legislation

Road safety legislation as indicated in the "The Road Traffic Act, 2004" and other "Legislative Instruments" on road safety provided comprehensive regulations of road traffic and road use to ensure safety on the roads. Currently, the principal road safety legislations in Ghana are The Road Traffic Act 2004 (Act 683); The Road Traffic Regulations, 1974 LI 953; The Road Traffic Offences Regulations, 1974 LI 952 and By-laws of Ministries, Departments and Agencies (MDAs).

4.5.2 Enforcement and Regulation (Police MTTU and DVLA)

The Station Officer of the police MTTU, Ho, said the aim of the police MTTU was to prevent and detect motor crime, prevent loss of lives and damage to property on Ghana's roads, ensure free flow of motor traffic, arrest and prosecute motor offenders and to ensure compliance of road traffic regulations.

The Licensing Officer of DVLA, Ho, confirmed that the aim of the DVLA was to promote good driving standards in the country and ensure safety of vehicles on roads. He explained further that the DVLA existed to ensure best practices of licensing drivers and vehicles to promote road safety and environmental sustainability, while pursuing integrity, excellence, professionalism and reliability in service delivery.

4.5.3 Driver Education

The Regional Manager of the NRSC contended that the aim of the NRSC was to provide effective leadership in planning, coordination, development and promotion of road safety to protect lives and property on the roads. He stressed further that the NRSC's aimed also to

develop the capacity to influence stakeholders in the quantity and quality of road safety interventions through education, publicity and information; research, monitoring and evaluation; road infrastructure development and safety engineering.

4.6 How the Approaches Ensured Road Safety

4.6.1 Legislation

The Road Traffic Act, 2004, ACT 683, and Legislative Instruments (LIs) explained how legislation on road safety ensured safety by setting road traffic regulations and penalties for violating them and these were divided into seven parts:

1. The principal road safety provisions – it contained the major driving offences which included dangerous driving; careless and inconsiderate driving; driving under the influence of alcohol or drugs; and wearing of protective crash helmets. A person who commits these offences is liable on summary conviction to a fine not less than100 penalty units and not exceeding 2000 penalty units or to a term of imprisonment not less than 6 months and not exceeding 5 years or both.
2. Restrictions on road use in the interest of road safety - the driving offences under this regulation included driving, stopping on verges or in dangerous locations and positions; leaving vehicles in dangerous positions; drivers to comply with traffic directions; and drivers to comply with traffic signs**.** A person who commits these offences is liable on summary conviction to a fine not exceeding 100 penalty units or to a term of imprisonment not exceeding 6 months or both.
3. Registration and licensing of motor vehicles – regulations regarding registration included registration of motor vehicles; registration numbers; use of unlicensed vehicles; use of unfixed registration numbers; and use of obscured registration numbers. The person who

commits these offences is liable on summary conviction to a fine not exceeding 100 penalty units or to a term of imprisonment not exceeding 6 months or both.

4. Licensing of drivers of motor vehicles – the rules guiding this included driving license. A person shall not drive a motor vehicle of any description or class on a road unless that person is a holder of a driving license authorizing that person to drive a motor vehicle of that description or class. A person who contravenes commits an offence and is liable on summary conviction to a fine not exceeding 250 penalty units or to a term of imprisonment not exceeding 12 months or both.
5. Tests of vehicles and issue of roadworthy certificates – The regulations under this part included tests of conditions of motor vehicles; and road use certificate. A person who drives on a road or uses a motor vehicle in respect of which there is no valid road use certificate commits an offence and is liable on summary conviction to a fine not exceeding 25 penalty units or to a term of imprisonment not exceeding 2 months or both.
6. Licensing of commercial vehicles - the rules regarding this included licensing of drivers of commercial vehicles. A person who drives a commercial vehicle without a relevant license commits an offence and is liable on summary conviction to a fine not exceeding 250 penalty units or to a term of imprisonment not exceeding 12 months or both.
7. Miscellaneous offences and general provisions – the rules under this part included spot fines; powers of the police officers and other authorized persons; and the power of police officers and vehicle examiners to require production of driving licenses. Where a person required to produce a license or any document relevant to driving a motor vehicle, the person shall produce it immediately or within twenty-four hours of being so required. Where a person required to produce a license fails to do so that person commits an offence and is liable on

summary conviction to a fine not exceeding 250 penalty units or to a term of imprisonment not exceeding 12 months or both.

4.6.2 Enforcement – Police MTTU

The MTTU police interviewed said they ensured safety on the roads by using different methods to enforce road traffic regulations:

- **Road checks in accident-prone towns to ensure compliance with speed limit and drunk driving –** According to a police officer *"a team of MTTU police normally go to towns where drivers normally exceed the speed limit and with the help of speed radar guns we arrest over-speeding drivers."* According to the police MTTU, *"depending on how much an offending driver exceeded the speed limit (50 kilometers per hour in towns) they were reprimanded accordingly; some offending commercial drivers were verbally warned and released; some were warned with letters written by the MTTU commander; and some others were prosecuted at the law courts."* The police confirmed that the presence of the over-speed team deterred drivers and this resulted in reduction of speed in those towns. The Police Officer explained further that *"even though the selection of venue and time for checking over-speeding drivers was random to avoid detection, commercial drivers who came across the team had a way of informing their colleagues of the presence of over-speed police on the road and these commercial drivers deliberately reduce their speed before reaching the location of the team."*

- **Road checks to ensure compliance with regularization of vehicle documents, license and over-loading –** The Station Officer of the MTTU police said: *"we make sure that drivers, especially commercial drivers regularize their vehicle documents such as insurance, roadworthy certificate and driving license. We also check overloading of vehicles with*

goods and passengers." He explained further that *"the purpose of the checks was to make sure that all the vehicle documents were in good order and also the vehicles were not overloaded with passengers or goods. This was because if any of the documents expired or the vehicle was over-loaded and an accident occurs the insurance company will not pay any compensation for either the victims or for the vehicle."*

- **Highway and Night Patrols –** According to a Police Sergeant *"a patrol team moves on the highways to make sure that broken down vehicles, the drivers, the passengers and their properties were protected from armed robbers or any danger they might be exposed to on the highways."*

- **Motor Traffic Control in Ho Township –** A Police Sergeant stated that *"a team of MTTU police go to Ho town, especially, on market days to control traffic at road intersections where there were no traffic lights, or where the traffic lights were not functioning."* According to him *"the aim of the exercise was to ensure free flow of motor traffic. Sometimes even when the traffic lights were working personnel were put there to prevent drivers from passing through the red light and arrested those who did so."*

- **Accident Investigation –** The Station Officer said *"police personnel investigate all accident cases and compiled data for information of NRSC and Police Headquarters."*

- **Road Safety Education –** As explained by the Station Officer, *"the police MTTU collaborated sometimes with the NRSC to provide education and information to road users, especially commercial drivers, to remind them of road traffic rules and how to be safe on the road. The Police MTTU also work with the DVLA by going on road checks and inspected licenses used by commercial drivers to find out if they were valid and appropriate for the*

vehicle being driven; they also visited accident scenes to ascertain the cause of accidents." The police MTTU, occasionally, together with the Transport Unions leaders educate commercial drivers on road traffic rules.

The Station Officer of the Volta Regional Police MTTU confirmed the main functions of the Police MTTU as: "*Traffic control and management; enforcement of road traffic rules and regulations; investigation into and collection of data on accident cases reported; escort and dispatch duties; and education of drivers and the general public on road safety matters."* He pointed out the most prevalent and recurring offences committed especially by the commercial drivers in Ho Municipality as: "*overloading of vehicle with passengers; picking passengers at prohibited areas; drunk driving; over-speeding; failing to regularize vehicle documents such as insurance, roadworthy certificates, driving license; and causing road obstruction."*

4.6.3 Regulation and Enforcement – DVLA

The DVLA, according to the Licensing Officer, ensured safety on the roads by regulating and enforcing road traffic rules using different methods:

- **Licensing of Drivers** – The Licensing Officer explained the requirements to obtain driving license as follows: *"the applicant must be 18 years and above; must possess Basic Education Certificate Examination (B.E.C.E.) or the ability to read, comprehend and write simple English language; not have any physical or mental disability; produce four recent colored passport size photographs; picture to be endorsed by authorized or schedule officer; and the applicant would then go to purchase a medical form for the vision test."*

  The Licensing Officer stated the procedures for licensing drivers as follows: *"Upon submission of successful medical report the applicant is taken through the road signs and*

*road markings before the acquisition of the learner license. After three-month driver training the applicant submits his/her application form and the leaner license to the schedule officer and he/she is taken through driving test. Before the practical driving test, the applicant undergo a theoretical test to enable him/her identify and interpret the road signs and road markings, since these languages of the road guarantees the safety of the applicant, the examiner and other road users during the test. The applicant must obtain 70 percent and above for the process to continue. During the practical driving test the examiner would observe how the applicant deal with the steering handling control, gear selection, taking offs on both level and on gradients, reversing and display of road sense. The applicant must be able to control the vehicle in traffic. Bring the vehicle from a normal speed to a standstill at an appropriate part of the road and to stop the vehicle in an emergency. He/she must be able to turn corners, cross main roads and turn from side to main roads, to pass and overtake vehicles, to understand the indication of speed and figures shown on the speedometer. When an applicant passed a driving test to the satisfaction of the testing officer, the applicant would be given a certificate of competency stating c*lass *or type of vehicle on which applicant was tested and the type of license the applicant is qualified to receive. The applicant then pays for the driving license booklet and a cover note issued to enable the applicant collect license in 30 days from the date of issue of the cover note. However, where the applicant fails to pass the test his shortfalls would be recorded on the form and a new date for retesting would be communicated to the applicant."*

- **Renewal of Driver's License** – The existing Legislative Instruments, the Road Traffic (Amendments) Regulations; LI 1663 of 1999 made it mandatory for the renewal of the new driver's license every two (2) years from the date of issue. However, the driver's license

expires six years after the date of issue. The Licensing Officer said *"the license holder is required after the payment of the appropriate fee, to pass a vision test, which must be certified by ophthalmologist in accordance with standards specified in the Legislative Instrument before every renewal of the Driver's License and the renewal is done personally at the DVLA Office."*

- **Upgrading of Driver's License** – The Licensing Officer explained that *"it is the policy of Ghana that to upgrade a driver's license the applicant must be present and must have held their current category for not less than two (2) years. Driver's license upgrading requirements he said includes the previous driving license; the applicant must possess B.E.C.E. or the ability to read, comprehend and write simple English language, passport pictures (2) and the appropriate form. The procedure for upgrading a driver's license also includes filling of the appropriate forms, theoretical (written) test, and test on road signs, in-traffic test, collection of cover note and the collection of license."*

- **Inspection, Test and Registration of Vehicles** – Registration of vehicles requires that the vehicle could be registered by the owner of the vehicle, authorized agent or declaration (from court). The vehicle registration procedure as explained by Vehicle Testing Officer *"it involves the presentation of the vehicle documents to CEPS officials for verification and release; the presentation of the released documents to DVLA; the presentation of proof of identity; the presentation of vehicle for inspection; the undertaking of physical inspection of the vehicle; the filling of the required forms and presentation to DVLA for registration number; the making of payments according to prescribed fees; the issuing of registration number and making entries in the register; inspection of number plates; and given out of duplicate registration copies to the owner or agent."*

- **Issuance of Vehicle Examination Certificates (road worthiness)** – The Vehicle Testing Officer affirmed that vehicles are physically examined before issued with roadworthy certificates. He said *"after payment of the appropriate fees, the vehicle is taken to the garage for examination of the chassis number, headlights setting, indicator lights, brake light, reverse light, wiper, brake system, warning triangle, fire extinguisher, spare tyre and anything that matter for the safety of the vehicle."* He explained further that *"if after the examination any part of the vehicle is found to be faulty, the drive is asked to go and repair it and return for re-examination before it is issued with roadworthy certificate."* Commercial vehicles road worthiness he stated lasts for six months, so they renew their roadworthy certificate twice in a year.

- **Accident Investigation** – The Vehicle Testing Officer asserts that in an event of an accident on the road an official of the DVLA and the police had to visit the accident scene to ascertain the cause of the accident. Without the DVLA the accident vehicle(s) will not be removed from the accident scene.

The functions of the DVLA as confirmed by the Licensing Officer at the Volta Regional office of the DVLA, Ho, is *"to establish standards and methods for the training and testing of driving instructors and drivers of motor vehicles and riders of motor cycles; establish standards and methods for the training and testing of vehicle examiners; issue driving license; inspect, test and register motor vehicles; issue vehicle registration certificates; issue vehicle examination certificates; and maintain registers containing particulars of licensed motor vehicles, driving instructors, driving schools and drivers of motor vehicles."*

4.6.4 Reinforcement

The Regional Manager of the NRSC said the NRSC together with some insurance companies and the police seldom organized best driver award for commercial drivers where deserving drivers were rewarded. The NRSC also organized and celebrated annually road safety week and part of the programme was Transport Union Award Scheme where quiz competition was organized for the Unions and together with some other criteria a winner was declared. The Union that won, together with the first and second runner-ups were asked to select a number of their drivers for training by the National Drivers Academy in Accra for free as an incentive to the drivers and their Unions.

4.6.5 Education

Road safety education in Ghana was mainly provided by the NRSC as stated by the Manager of NRSC. According to him, sometimes educational campaigns were carried out by the NRSC together with the police MTTU and the DVLA. Transport Unions also, occasionally, provided education for their members and sometimes they invited the police MTTU to educate their members on road safety issues.

According to the Manager the NRSC ensured road safety through the following programmes and activities:

- Road Safety Education in Schools – Child Road Safety Programme targeted children in basic schools and the rationale for the programme was to instilling positive road user behaviour among young school children.
- Targeted campaigns – The NRSC organized targeted campaigns on excessive speed, driving under the influence of alcohol or drugs, driving tired (fatigue) coupled with wrongful overtaking and inattentiveness, seat belt and crash helmet usage. The campaigns targeted

commercial drivers and motor cyclists and aimed to produce behavioural change among the commercial drivers and motor cyclists.

- Community Road Safety Education Programmes – The NRSC organized outreach programmes in some communities, churches and mosques in Ho Municipality. The targeted audience was the general public and the outreach programmes aimed to improve road safety related knowledge, attitudes and behaviours among all road users.
- Information and Publicity – Outdoor information and publicity materials such as bill boards, leaflets, hand bills and posters were distributed. The targeted audience was the general public. The rationale of information and publicity was to provide all road users information on road safety.

The Manager said *"the NRSC existed to be constantly reminding drivers, especially commercial drivers who were the main target, and other road users of road safety regulations. We used different programme delivery methods to educate commercial drivers and other road users and these included workshops, seminars, campaigns, posters, radio broadcast, newspapers, personal encounters, adverts, bill boards among others."* The Manager elaborated further that *"the NRSC coordinated the activities of road safety stakeholder institutions and organizations through the Regional Road Safety Committee. The committee was made up of representatives of the road safety stakeholder institutions and organizations. The NRSC together with the committee planned strategies for intervention issues in the region and gave direction as to how to implement those interventions."* The Manager stressed the measures used by the NRSC to improve road safety in Ho Municipality. He said they were build around pre-crash, crash and post-crash interventions involving Education, Engineering, Enforcement and Emergency Response Services.

According to the Manager, *"Education was mainly carried out by the NRSC and included information, publicity, research, monitoring, co-ordination, advocacy and networking to create awareness and improve knowledge and understanding of road safety. For engineering, the NRSC coordinated activities performed by the road agencies such as Ghana Highways Authority, Departments of Urban and Feeder Roads. These agencies provided road signs, fix speed limits, and provided road infrastructure and furniture to minimize risks associated with road infrastructure. For enforcement, the NRSC in collaboration with the police MTTU and the DVLA ensured compliance of road traffic laws and regulations; and emergency and medical services provide post-crash care for crash victims and were handled by the Ambulance Services, the Red Cross and the Fire Service in collaboration with the NRSC."*

4.7 Road Safety Challenges Faced by the Approaches to Changing Driver Behaviour

4.7.1 Legislation

The current state of road safety legislation in Ghana as explained by the Regional Manager of the NRSC gave rise to vital challenges with road safety. The key challenges included:

- A considerable number of road safety regulations in Ghana were outdated.
- Lack of adherence to most of the existing Acts, regulations and by-laws.
- Absence of a regulatory authority to enforce compliance.
- Inconsistencies in offence charging and prosecution of road safety violations.
- Subjective interpretation of existing road traffic laws and regulations.

4.7.2 Enforcement – Police MTTU

The Station Officer of MTTU, Ho reiterated that in Ghana, it appeared that traffic law enforcement was not very effective resulting in road traffic violations. The key challenges he pointed out included:

- The current enforcement unit, MTTU, was considered a normal part of the operations of the Ghana Police Service with regular rotation of staff.
- High attrition rate of trained traffic enforcement personnel. After training police officers in the enforcement of traffic rules they were transferred to other duties.
- Poorly equipped and under-staffed existing enforcement unit. The MTTU police have limited logistics to carry out effective enforcement of road safety regulations. They lack the following devices and equipment: speed radar guns; alcometers; recovery trucks; patrol vehicles; motor cycles; and adequate personnel.
- The apparent lack of a structured enforcement programme that often leads to inconsistencies in traffic law enforcement practices and tactics.
- Lack of specialist training available for MTTU officers because the Police administration does not consider traffic enforcement as a specialized activity.
- The police MTTU also had problems with political interference in the discharge of their duties, when some commercial drivers were arrested for committing traffic offences, people in high offices intercede on their behalf to be released.
- When a police officer arrested a driver for committing road traffic offence and board the vehicle to be driven to the nearest police station, some of the commercial drivers drive the vehicle to an isolated location and abandon the police officer and the vehicle to their fate.
- Sometimes when a police officer seize the license of a commercial driver for committing an offence the driver will not follow up to the police station, but would rather go in for a new license.

4.7.3 Regulation and Enforcement – DVLA

The DVLA, according to the Licensing Officer, in ensuring safety on Ghanaian roads has the following challenges:

- Drivers with licenses and skills for smaller vehicles were found driving heavy-duty vehicles without any proper training or certification;
- Lack of adequate capacity in terms of qualified personnel, infrastructure and equipment at DVLA and this makes it impossible for effective vehicle inspection, driver training, testing, certification and licensing;
- Many drivers secured fake driving licenses – the activities of middlemen who defrauded unsuspecting driving license applicants and issued them with fake licenses.

4.7.4 Education – NRSC

The Regional Manager said the NRSC as a service organization had good strategies for ensuring road safety but had problems with the implementation of these strategies due to internal and external challenges.

The internal challenges he stated included:

- Lack of adequate funding, logistics, staff and the needed support from stakeholder institutions.

The external challenges included:

- Lack of mandate by the NRSC to enforce compliance by stakeholder institutions;
- Political interference in the activities of the NRSC;
- The use of motorbikes for commercial purposes in the Ho Municipality where the motor riders did not register the motorbikes, they did not have licenses and the riders and their passengers did not wear protective helmets;

- Illegal and inappropriately converted vehicles (such as, cargo vehicles converted to commercial vehicles and petrol engines converted to liquefied petroleum gas) and the use of inappropriate materials caused road traffic crashes leading to serious injuries and fatalities;
- The use of sub-standard parts and tyres also contributed to road traffic crashes.

In summary, the demographic characteristics of the commercial drivers showed that they were matured and met the minimum level of education required to practice good safety culture. Majority of them have trained through informal means but have been driving for a mean period of 14.32 years and as such, were expected to acquire enough skills through experience to exhibit good driving behaviours. The commercial drivers perceived the police MTTU and DVLA to be generally effective in enforcing and regulating road laws, however, majority of them have not had any incentive or attended driver education and training since they started driving as a form of motivation. There were legislation that spelt out road rules and mechanism for enforcement and regulation by the police MTTU and the DVLA. The NRSC existed to provide education and training for road users, but these institutions were saddled with challenges that made it impossible to achieve their set targets and this had resulted in the unacceptable level of road traffic accidents in the country.

CHAPTER FIVE

DISCUSSION OF THE RESEARCH FINDINGS

5.1 Introduction

This chapter discusses the results of major findings revealed in chapter four of the study in relation to the three stated objectives for this study, issues raised in the literature review and the theoretical framework. The discussions of the results are based on the following objectives outlined for the study.

- The demographic characteristics of commercial drivers in Ho Municipality.
- Tools used to change road user behaviour of commercial drivers.
    - Legislation
    - Enforcement
    - Reinforcement
    - Education
- The challenges faced in the application of these behaviour change tools.

5.2 The Demographic Characteristics of Commercial Drivers

Generally, the demographic characteristics of the commercial drivers in terms of age distribution and educational level, favour good safety practice. This is because they are all matured and educated for which reason they should be able to take safety precautions.

5.2.1 Age Distribution

Findings from the age distribution revealed that the majority of the commercial drivers are adults in the active and responsible working age group of between 25 and 54 years. This is similar to the study conducted by the NRSC (2006) on commercial drivers, where the majority of the commercial drivers were within the very active age group of 26 to 49 years. This gives an indication that most of them can accept and be able to practice good safety culture. The

distribution also indicated that there are few people within the youngest and older age groups. This is a good signal because, age, according to McKenna (2006), is associated with crash risk and involvement with younger drivers having a higher crash risk than the older drivers. The factors identified that underlie age effect are experience and sensation seeking which is associated with risky driving such as speeding. As drivers accumulate greater age (maturity) and experience, crash risk decreases. Both increasing age and experience contribute to reduced crash risk. The few old drivers also have an increase decline in their functional ability. This is in consonance with the assertion by Hutchins (2008) that newly qualified drivers are at a higher risk of being involved in road traffic accidents than are more experienced drivers, because newly qualified drivers may not have anyone with them to answer any driving related questions which may arise. According to Hutchins, research suggested that learner drivers believe that "real driving" is fundamentally different from the driving required to pass the driving test and that some drivers experience the loss of their instructor as a negative event.

In the informal system of apprenticeship the driver trainee had to spend a minimum of two years in training as this will help reduce the age effect of experience as the driver trainees will have a longer period of supervised driving. Also, most newly trained drivers after graduation lacked the necessary experience to drive a commercial vehicle and had to spend some time with a more experienced driver before they could be on their own. Brown (1997) noted that the breadth and depth of experience received by learner drivers when supervised by friends or relatives is generally greater than professional instruction. This agrees with McCartt et al. (2003) who suggested extending the training phase to increased supervised driving. The sensation seeking of young and newly trained drivers can be reduced by focusing their training on hazard perception since according to McCartt inexperienced drivers are slow to detect hazards so that they can

reduce behaviours and attitudes to risk that expose them to hazardous situations. Early post-drivers should be limited in their exposure to risk such as night driving, driving and carrying teen passengers and driving when raining.

5.2.2 Educational Level

All the commercial drivers meet the stipulated minimum requirement of a Basic Education Certificate (BECE) and or Middle School Leaving Certificate (MSLC) which was set by the DVLA in 2008, a few attended or completed secondary school. This is comparable to NRSC (2006) study where the highest level of educational attainment for most of the commercial drivers was at the JSS or MSLC level. Even though the educational level seems to be low, it gives a sign of good safety practice in terms of the driver's ability to read, understand and assimilate issues relating to road safety rules and regulations.

The level of education of the commercial drivers can also have implications in terms of safety, especially on road safety measures which are not self-enforcing such as road signs and markings as some of them may not be able to interpret them, the measures may therefore be less effective in warning, prohibiting or regulating drivers, unless they are integrated with publicity and enforcement. The low level of education of the commercial drivers may also not enable them to glean for information to improve their knowledge and skills of their vocation or profession.

5.2.3 Driving History

Learning by apprenticeship is the commonest mode of training for most of the commercial drivers as indicated by the findings. They trained through various informal arrangements with the exception of a few who learnt driving through formalized means of an established driving school. This mode of driver training gives some course for concern in terms of safety. The

driver's apprentice starts with the performance of little tasks such as moving a vehicle during washing with skills acquired from observing his master and progresses to the level of spare driving before qualifying as a driver. Such drivers were not taken through any education or training on road safety rules and regulations or road signs and markings. This approach of driver training results in the successive transfer of bad driving cultures and habits from one badly trained driver to the other which has serious consequences on safety, since much of this learning process takes place in an unstructured and informal way, with no guarantee that what is learned is the most appropriate for the safety of the traffic system. The situation is even worse with those who were self-taught without the assistance of any instructor since such a person is a threat to other road users. This is because newly qualified drivers, no matter their mode of training as explained by Hutchins (2008), face some challenges as a solo driver such as poor opportunity for feedback, involvement in a variety of traffic conditions, different manoeuvres, unexpected actions of other drivers, different types of roads and distractions. But as explained by NRSC (2006), the practice of learning by informal means is considered somewhat legal since there is no regulation on the means by which a driver should be trained so far as the person is able to pass the test requirements for licensing.

About 88 percent of the commercial drivers have more than 5 years experience in the driving profession and about 78 percent have more than 5 years experience as a commercial driver. This is comparable to 85 percent of drivers who have over five (5) years experience in the profession (NRSC, 2006). This should ideally give some positive indication for safety issues on the assumption that better skills and improved performance have been acquired from the years of experience. However, this does not reflect with the statistics on the percentage of accident situations attributed to driver error in the country. According to Gregersen et al. (2000) as skills

develops with increasing experience, particularly during early driving, emphasis on safety-orientation decreases, so there is the need to allow skill to build-up through practice in low-risk situations.

The majority of the commercial drivers interviewed (87 percent) affirmed they have driving license issued by the DVLA. This was higher than 70 percent obtained by the NRSC (2006) in their commercial driver study. The assertion by most of the commercial drivers of having license issued by the DVLA could be encouraging in terms of quantity. Since the authenticity of the license holding by commercial drivers who claim to have obtained their license from the DVLA could not be established by physical observation and certification, there was the possibility that some of such claims could be false. Also, those drivers who obtained their licenses through their masters or agents are also of safety concern. Since they acquired their license from unidentified sources and were not tested by the DVLA, they may not be qualified to drive a vehicle and may serve as a source of threat to other road users.

All the commercial drivers renewed their license and the majority also upgraded their license at DVLA and that was a good indication for safety. This is because before the renewal the eye sight of the driver is tested to ensure that the driver has a good sight, a condition necessary for driving. The applicants are also tested to make sure they are abreast of road traffic rules and regulations. Those drivers who upgraded their license through an agent are a danger to other road users since they were not tested to ensure they were qualified and permitted to drive vehicles in the higher category.

The process for inspection, testing and registration of motor vehicles, issue of vehicle registration certificates, vehicle examination certificates and renewal of road use certificates required that all vehicles must be physically inspected by DVLA or licensed private garages.

This was done by the majority of the commercial drivers. However, some drivers renew their road use certificates without sending the vehicle for physical inspection and this has safety implications. Vehicles which have not been physically inspected before being issued with road use certificates, especially, commercial vehicles which are always in motion, can develop defects which when not identified and corrected could result in an accident.

5.3 The Perception of Commercial Drivers about the Approaches used to Change Driver Behaviour

Commercial drivers are expected to be knowledgeable about road traffic rules and regulations because they have to study them and pass written driving test, road signs test and in-traffic test before obtaining and upgrading driving license. They are also presumed to have contact with DVLA where they test to obtain license, renew license, and renew roadworthy certificates. Commercial drivers have high exposure driving and are assumed to have encounters with the Police MTTU. As a means of improving their profession, commercial drivers are expected to have contact with road safety education providers. With the expected regular contact with these behaviour change institutions they should be in the position to assess their performance.

5.3.1 Legislation

The findings of the knowledge of commercial drivers on road traffic rules and regulations revealed that majority (78.2 percent) of them had poor knowledge on road traffic rules and regulations as they were able to mention only a few of them. The mode of training and level of education had no effect on knowledge of road traffic rules and regulations and this is of much safety significance. To be a safe and responsible driver takes a combination of knowledge, skill and attitude. Knowing the traffic laws and driving practices help traffic move safely and breaking of the "rules of the road" is the major cause of collisions. This was supported by United Nations Economic Commission for Europe (UNECE, 2012), that the majority of traffic

accidents are related to failure to observe regulations relating to speed, alcohol, and seat-belt or to poor understanding of specific traffic conditions such as night driving. Traffic rules and regulations are devised to assure the smooth flowing of motor vehicles in the roads. Moreover, traffic rules and regulation are not only for the driver of the vehicles but at the same time these rules are meant for the pedestrians, cyclist, motor-cyclist and other road users. The thorough knowledge of traffic rules and regulations, traffic signs and markings are very essential for the drivers and road users. The proper knowledge of these rules can reduce the number of accident and thus can establish a healthy and organized traffic system in the country**.**

5.3.2 Enforcement – Police MTTU

The findings from the perception of the performance of the Police MTTU by the commercial drivers on enforcement of road traffic rules showed that, in general, the MTTU was effective in the performance of their duties. But the commercial drivers who perceived the Police MTTU to be ineffective gave some comments that were contrary to this general perception. Also, the NRSC (2006) thought there were some institutional, administrative and procedural inadequacies on the part of Police MTTU in enforcing road traffic rules and regulations.

The Road Traffic Act, 2004, provided for offences such as driving under influence of alcohol or drugs; seatbelt use; carrying of children in motor vehicles; safety equipment for children; and wearing of crash helmets in its principal road safety provisions, but the enforcement rates for offences such as driving under influence of alcohol or drugs, seatbelt and crash helmet use are very low and offences concerning carrying of children in motor vehicle and child safety equipment in vehicles are not enforced at all. Meanwhile, injury protection devices such as seatbelt and child restraints according to UNECE (2012) are the major risk factors for motor vehicle occupants and are effective in reducing death and serious injuries in road traffic crashes.

In accordance with the Commission, the situation of use of these devices can be improved by mandatory legislation and enforcement accompanied by publicity. Helmet use also reduces serious and fatal injuries as disclosed by research reviewed by General Accounting Office (1991). Drinking and driving was classified by World Report on Traffic Injury Prevention (2004) as one of the five principal risk factors in road safety. Unfortunately, there is low probability of apprehension of offenders as the police MTTU do not have enough logistics and personnel to enforce the law on this offence. This was in accordance with the findings of Lonero et al, (2007) that there was one arrest per 200 impaired trips.

Speed was identified as one of the major offences committed by commercial drivers in Ho Municipality. Speed limits were set in our legislation (50 km/hr in towns and villages; 80 km/hr on highways; and 100 km/hr on motorway), there are road side signages and there are also physical speed reducing measures such as speed humps on some of the roads in some communities. In spite of all these, drivers still exceed speed limits in towns and villages. To curb this menace, there is the need for highly visible police surveillance and cues that signal high degree of certainty that enforcement would take place and it should have a long duration. But the police MTTU are challenged by lack of personnel and equipment to efficiently and effectively carry out these functions. However, as noted by Wegman and Aarts (2006) police enforcement must be accompanied by information to drivers on the problem of speed and speeding, what the speed limit system is and why and the outcome of these measures. For police enforcement to be effective in controlling speed in Ho Municipality, the NRSC together with the police MTTU must intensify public education and information on speed, because as explained by Wild (1991), the more broadly the media inform people on an issue the more likely they will make sensible decisions.

The findings also revealed that motivation for enforcement serve as a barrier to road safety in Ho Municipality. Some commercial drivers accused the police MTTU of extorting money from them whether they commit road traffic offence or not. This confirmed what was noted by Evans (2004) cited in McKenna (2006) where authorities were accused of using traffic enforcement for revenue collection as opposed to harm reduction. The situation was blamed on police corruption, that is, the misuse of police authority for personal gains such as extortion (demanding money for not processing people for court for committing traffic offences) and bribery (accepting money from drivers in exchange for not enforcing the law). Police corruption is perceived to be rife in the police MTTU, but the police also accused motorists who willingly offer bribes to police officers to avoid being arrested for breaking the laws. The police must be seen as enforcing the road laws by offering drivers who are caught committing road traffic offences may be offered rehabilitation rather than just punishment.

The commercial drivers also accused the police of always going after them instead of running after armed robbers on the highways. This goes to corroborate what McKenna (2006) identified as public perception of the role of the police as barrier to road safety. According to McKenna, arguments encountered were that the police should be out chasing real criminals rather than traffic violators. McKenna believed that these barriers can be dealt with by introducing a system such as safety camera that involved a high degree of detection (prominently displayed) with a reasonable duration of enforcement (operating day and night) and with a high degree of perceived legitimacy (camera located in known safety problem areas, warning of drivers by camera and offenders offered rehabilitation rather than just punishment). Safety cameras can be introduced in Ho Municipality in addition to the existing police MTTU personnel to support the perceived legitimacy of enforcement and compliance by the drivers.

There are other risk behaviours such as mobile phone use, fatigue, running red lights and close following, but these risk behaviours, even though there provisions for them in the road traffic rules, they are not seriously enforced in Ho Municipality. The reason might be that their methods of detection are not as developed as those for speed as explained by McKenna (2006). As he put it, when speed is used as method of detection, other risk behaviours could also be identified. Also, those who tend to speed also tend to engage in other risk behaviours such as run red lights and drink-drive, so advantage is taken of a unique opportunity to address other issues.

5.3.3 Regulation and Enforcement – DVLA

The findings from the perception of the performance of the DVLA by the commercial drivers on regulation and enforcement of road traffic rules showed that, in general, the DVLA was effective in the discharge of their duties. But the commercial drivers who perceived the DVLA to be ineffective gave some comments that were contrary to this general perception. Also, the NRSC (2006) thought there were some institutional, administrative and procedural inadequacies on the part of DVLA in regulating and enforcing road traffic rules.

The Road Traffic Act, 2004 and Legislative Instruments (LIs) on road safety made provision for registration and licensing of motor vehicles, licensing of drivers of motor vehicles and tests of vehicles and issue of road use certificates. These are regulated and enforced as some of the core functions of the DVLA. Nevertheless, some drivers were able to obtain driving license, some were able to upgrade and some renewed their road use certificate through an agent without going to the DVLA and these could have serious safety implications.

Obtaining driving license requires the applicant to be 18 years, be present, have some minimum level of education, undergo eye test, and theoretical and practical examinations. Upgrading of license also requires a valid driver's license, a minimum level of education and the presence of

the applicant. For a person to obtain driving license or upgrade driver's license through an agent means the person did not satisfy the requirements and did not also go through the procedure for obtaining driver's license or upgrading of license. Such a person is a threat to other road users because that person was not tested or examined to qualify to drive a motor vehicle or the class of vehicle with the upgraded license. Renewal of road use certificate through an agent also means that the vehicle was not sent for physical examination. Such a vehicle is also a threat to other road users because any defect on them could result in an accident.

The agents who carry out these activities, as explained by the Licensing Officer, DVLA, Ho, "are the unauthorized persons ('goro boys') who loiter around the premises of the DVLA looking for customers whom they assist in procuring vehicle document for a fee. They may be either operating through schedule officers at DVLA with whom they share their income or employees and other officers at DVLA who are not on the appropriate schedule but manage to get the genuine document through fraudulent means. There could also be external illegal operatives who provide them with fake documents for a fee." There were allegations of some officials of the DVLA collecting money from driver's license applicants who failed their test or examinations and made them to pass. This is also of safety concern, because the failed applicants may not be competent enough to drive safely when licensed. According to Mayhew and Simpson (1995), inexperienced or incompetent drivers lack the necessary driving skills and capabilities to cope with basic tasks (hazard perception and problem solving) both of which are crucial parts of safe vehicle operation.

5.3.4 Reinforcement

The findings from the study disclosed that the majority of the commercial drivers have not had any incentive or reward since they started driving, but this did not discourage most of them from

attending driver education or training to improve their knowledge and skills on road safety. This validated the findings by Geller et al. (1987) in their review of the use of different types of incentives and reward in road safety. They noted that all the types of reward programmes used were effective, but surprisingly, the strongest and the longest lasting effect came from the no-reward programmes. Other studies conducted by Lonero et al. (2007) showed that no-reward programmes had an effect that lasted longer after the programme had ended than the reward programmes. Commercial drivers who were given incentive or reward were not motivated to attend driver education or training to improve their knowledge or skills. This means that reward does not necessarily encourage commercial drivers to improve the knowledge and skills of their profession. This was supported by Harano and Hubert (1974) who experimented on a group of drivers who were given free license as a simple reward for a one-year clean record. Unfortunately, they performed worse than controls in the subsequent period. This implied that the use of behavioural technique can help but may also harm or be ineffective.

The NRSC together with the DVLA and the Police seldom organize best driver award for commercial drivers. The NRSC celebrated annually road safety week and part of the programme was Transport Union Award Scheme. Even though individual drivers competed for their unions, the award went to the union, not the individual drivers. Road safety incentive programmes should be based on positive reinforcement of good driving skills. To avoid accidents drivers need to be motivated to follow established road traffic rules and this can be done by supplying them with incentives that will encourage, inspire, cultivate and influence individual commercial drivers to act in a desired behaviour to achieve safety on the roads. For commercial drivers, individual performance, rather than group performance should be used as this will encourage the practice of safe behaviour in an anticipation of wining another award the next time round. To

bring about a general improvement in driver behaviour it will be necessary to ensure that drivers are sufficiently motivated and their training should be integrated with publicity, campaigns, incentive schemes and enforcement.

5.3.5 Education

The findings from the study revealed that about half of the commercial drivers interviewed have not attended any driver education or training since they started driving. Some of the drivers had not heard of or come into contact with any education or training programme, but some just refused to attend and this has implications in terms of safety. The findings further showed that some drivers who deliberately refused to attend driver education or training thought they were more skillful than the average driver. If the vast majority of drivers believe that the less skillful drivers are the other drivers, they would not pay attention to risk and this can be a concern in terms of safety. All drivers including new drivers, as explained by Mayhew and Simpson (2002), need to acquire knowledge of the rules of the road and how the vehicle works. This knowledge is often gained in a driver education or driver training class, with some behind-the-wheel learning. Skills are an essential component of ability and are crucial to safe driving behaviour. Skills generally can only be acquired through training and repeated practice. Considering the complexity and the multi-tasking demand of safe driving, most drivers have received little training hence the high crash rate.

The findings showed that road safety practitioners used different methods such as road safety education in basic schools, targeted campaigns, community outreach programmes, driver training and information and publicity to provide education and training for commercial drivers and they targeted specific knowledge, skills and behaviours which included roads and their safe uses, crossing drill, child safety in cars, "trotros" and buses, exceeding speed limits, driving while

intoxicated, mobile phone use while driving, fatigue, seatbelt and crash helmet use, existing road traffic rules and regulation, consequences and penalties of violation of traffic rules, causes, effects and prevention of road traffic accidents. Defensive driving, driving under hazardous conditions, observance of road signs and markings, overloading of vehicles, wrong overtaking and respect for other road users. Proactive driving requires drivers to increase their knowledge, skills and competencies crucial for developing a driver safety culture. Skills are an essential component of ability and are crucial to safe driving behaviour, but generally, they can be acquired through training and repeated practice. To take up new ideas, skills, and knowledge, drivers need to be aware of their capabilities and limitations and the ability to internalize driving experience is a crucial safety skill. Awareness relates to knowledge of the road environment, having awareness of hazards and risks, knowing what is happening in to the vehicle and knowing the road laws and these are provided by driver education and training.

The findings also showed that driver education and training were provided by various organizations such as NRSC in collaboration with either DVLA or Police MTTU or both of them. The Transport Unions and some private companies also provided education for their drivers. Provision of education and training on road safety is not limited to any one organization. A number of organizations such as governmental, non-governmental, private, civil society organizations and community based organizations have a role to play in ensuring safety on the roads. UNECE (2010) believed that it is the duty of all those concern to mobilize to address the road safety crisis which is a multi-faceted problem requiring political leadership, a systematic response, well orchestrated action and collaboration of government, business, and civil society at all levels to achieve results.

The findings revealed that commercial drivers who attended driver education and training said education and training reminded them of road safety rules and regulations and as a result they were more attentive and cautious when driving, they do not exceed speed limits and respect road signs and markings and these had paid off because they have not been involved in any accident. In view of the fact that the vast majority of road accidents are linked to inappropriate behaviour on the part of road users, efforts need to be made to change it and stop accidents from being a commonplace occurrence. One of these efforts involves making road users aware of the dangers of the road and the risk they must incur by not observing the rules. Driver education and training provide drivers with the requisite knowledge and skills they need to be safe on the roads. With continuous provision of driver education and training to commercial drivers they will internalize what they learn and practice and use them.

A wide range of educational programmes have been pursued for commercial drivers in Ho Municipality. The programmes have been variously aimed at increasing knowledge and changing attitudes and targeted at some behaviour. Many of the educational programmes (McKenna, 2010) appeared to be based on the proposition that people suffer a deficit of information. The assumption behind this approach according to McKenna is that people would refrain from taking risk if they were supplied with adequate information, and if this information is presented effectively enough, will result in behaviour change and a reduction in harm. The difficulty for this position as indicated by Marteau et al. (2002) in McKenna (2010) is that the evidence does not support it. Marteau et al. said further that in many cases people do know which behaviours are harmful, so there is no information deficit and when there is an improvement in knowledge, there is still no change in behaviour. They explained that education measures are often of short duration, such as length of session, number of sessions and spacing

between sessions, as such have little opportunity to compete with the more enduring pressures on an individual.

5.4.1 Challenges as a Commercial Driver

Some of the commercial drivers were fervent about the current condition of the road infrastructure in the Ho Municipality. There were reports of bad nature of the roads in terms of potholes, poor signing and markings and numerous speed humps some of which were constructed by people in some towns and villages. These as maintained by the drivers cause travel delays, fatigue and destruction of vehicle parts resulting in frequent breakdowns and accidents and its resultant fatalities and injuries. As indicated by OECD (2008), countries that have successfully reduced road traffic risk embraced a 'system approach' to road safety. The system approach they said looks at the traffic system as a whole and the interactions between roads; vehicle and road user in order to identify where there is potential for intervention.

The commercial drivers interviewed belong to one union or the other who operate from organized lorry stations. The requirements for joining the union are registration and payment of dues and some of the benefits are spare driving opportunities for unemployed drivers and collective bargaining for approved minimum transport fares from government. There are some drivers who are non-union members and are referred to as 'floating commercial vehicles.' According to discussion with some of the Transport Union leaders, 'floating vehicles' are a source of worry to the unions, because the 'floating vehicles' do not have any loading point and resort to bad driving behaviours such as loading and off-loading passengers at any place, over-speeding to hunt for passengers, drink driving and over-loading of vehicles. The situation of floating vehicles according to some respondents could be brought under control if the unions could meet some needs of the drivers such as benefit from legalized employment protection

system because they are supposed to operate under the constitutional framework of the Trades Unions Congress (TUC).

The respondents were concerned about their conditions of service. They explained that there are no defined conditions of service of the commercial drivers, that is, there are no legal backings for their employment or conditions of service. Commercial drivers are not on any proper salary scale (pay structure), no personal insurance in case of an accident, no health care, no retirement benefits or social security paid on their behalf by their vehicle owners even though there is a legal provision on behalf of all workers both formal and informal. The absence of these incentives influences commercial driver behaviour in diverse ways such as excessive desire to make much money. The resultant effects are over-speeding, overloading, driving for long hours which are some of the predisposing factors of road traffic accidents. They also serve as a disincentive for some drivers in practicing safe driving behaviour. Job satisfaction by the commercial drivers as indicated by NRSC (2006) may be determined by direct financial benefits, compensation plans, management attitude towards business practices, employee relations and morale, safety training and support programmes as well as vehicle maintenance programme.

The findings showed that commercial drivers do not have driver education and training opportunities in Ho Municipality to provide professional drivers with refresher courses. Driver education and training especially for commercial drivers should be part of transport unions' and companies health and safety programme since most of these drivers belong to unions and companies and it should reflect a genuine and ongoing commitment to road safety. The transport unions and companies will benefit from driver education which motivates drivers to improve their attitudes and behaviour. While the individual driver has responsibility for applying what is learned, the responsibility to provide education and training opportunities and monitor the results

of the training is the responsibility of the transport unions, transport companies or transport owners.

There were reports of increasing numbers of armed robber attacks on commercial drivers on the roads in the night, especially for those who travel long distances. As explained by the commercial drivers patrol teams of MTTU police are supposed to check the activities of armed robbers on the highways, but according to them the patrol teams are more interested in chasing cargo vehicles or patrolling in towns in the night.

The police MTTU however explained that the patrol division is the first line of defense against illegal and unacceptable behaviour and the patrol officer is often the public's initial point of contact. The patrol division's priority is protecting the safety of motorists, bicyclists and pedestrians. These officers are tasked with many duties including responding to calls for police service, investigating of criminal activity, checking on suspicious people and activity, investigating accidents, enforcing violations of law. It was suggested that the public must be educated on the roles of the police so that the responsibilities of the police will not be misconstrued.

5.5 The Aim and Objectives of Approaches used to Change Driver Behaviour

The findings showed that Ghana has a comprehensive legislation on road safety, 'The Road Traffic Act, 2004', Act 683, and other legislative instruments (LI) which defined the offences, the enforcement and regulation actions and the penalties for violation so as to ensure safety on the roads. But as indicated by Lonero et al. (2007), legislation by itself has limited influence; it needs more support over the long term if it is to play a dynamic and effective role in permanently changing road user behaviour. The level of road safety is ultimately determined by the quality of the delivered interventions, which in turn are determined by the quality of the institutional

management functions. These functions are delivered primarily by government agencies such as Police MTTU, DVLA and NRSC and stakeholder institutions and also delivered by government partnership with non-governmental organizations, civil society organizations and business entities. Without effective institutional management, as Bliss and Breen (2008) noted, there will be little chance of implementing successfully road safety interventions.

The findings revealed that the police MTTU exist to enforce road traffic rules and regulations to ensure safety on the roads while the DVLA exists to ensure best practices of licensing drivers and vehicles to promote road safety. To encourage and promote good quality service delivery and to maximize the effect of enforcement and regulation to meet the road safety targets set by enforcing and regulating agencies, the Police MTTU and DVLA, must work within a performance management framework, which considers both outcomes (aims and objectives) and outputs (enforcement and regulation) which has been put in place to promote effectiveness and efficiency. Such a framework, as explained by Yannis et al. (2004) will result in well-planned, intensified police controls on selected locations of the road network, resulting in an increase in the perceived risk of apprehension. As a result violation rates will decrease and changes in road user behaviour will result in less traffic crashes and less traffic victims, and in reduced monetary costs for society.

The findings disclosed that the NRSC has a strategic objective to provide leadership in the development and implementation of measures that will reduce road traffic accident fatalities on a year-on-year basis. To be able to achieve this NRSC need to engage all the main players with government responsibility in road safety as well as other key players in addressing national road safety targets. The NRSC should play a guiding, encouraging or catalytic role and as a lead agency take responsibility within government for the development of the national road safety

strategy and its focus results. According to Bliss and Breen (2008), to be effective, the NRSC should be engaged in the delivery of and supported by strong horizontal inter-governmental coordination arrangements; good vertical coordination of national, regional, district and local activity; coordination of the necessary delivery partnerships between government stakeholders, the professionals, non-governmental and business sectors, parliamentary groups and committees; a comprehensive legislative framework; sustainable sources of annual funding and a rational framework of resource allocation; high-level promotion of road safety strategy across government and society; regular monitoring and evaluation and strong research and technical support.

5.6 How the Approaches Ensured Road Safety

Interventions comprise legislation that sets standards and rules specifying how the road network is to be used safely and systems of ensuring compliance using a combination of education, enforcement and incentives or rewards. The study looked at how these approaches were used to ensure road safety in Ho Municipality:

5.6.1 Legislation

The findings showed that legislation set socially acceptable standard for safety on the roads, spelt out the condition under which a person would be said to have committed road traffic offence and also sanctions to be imposed on violation. The 'Road Traffic Act' and Legislative Instruments on road safety took into consideration the level of severity of the offence and it is based on these that penalties are imposed on a person who is liable on summary conviction to a fine of a number of penalty units, term of imprisonment, or to both. In the case of dangerous driving the court may upon conviction order the payment of compensation to an injured person or property, or order the withdrawal of driving license for a period between 3 and 5 years. For the legislation to

be effective in achieving these objectives, Lonero et al. (2007), believed it must be supported with effective enforcement to create a credible deterrent and encourage people to develop the habit of compliance; reinforcement in the form of prompts, feedback and incentives to increase people's desire to develop good driving habits; and education to help people develop knowledge, skills and change in attitude. But the findings showed that the commercial drivers who are the main users of the roads are not conversant with most of the traffic rules and regulations. This might be the cause of poor road user behaviour exhibited by some road users, especially, commercial drivers. Poor knowledge of road traffic rules could be attributed to the inaccessibility of Act 683 to drivers. Unlike the Highway Code, which serves as a standard of behaviour and a source of guidance to drivers and other road users, is provided to applicants of driving license, but there is no place known to a commercial driver or for that matter any driver or road user where they can get access to the Road Traffic Act or Legislative Instruments on road safety. However, continuous provision of education and training on road traffic rule and regulations, especially for the commercial drivers will encourage them to practice safety culture. Also, the Road Traffic Act and Legislative Instruments on road safety should be made available to drivers.

5.6.2 Enforcement – Police MTTU

The findings showed that the police MTTU ensured safety on the roads through road checks in accident prone towns and villages to make certain compliance with speed limits and drink driving. They also use of road checks to ensure compliance with regularization of vehicle documents, license and overloading of vehicles. Enforcement, as claimed by Lonero et al. (2007), upholds society's expectations and standards and imposes sanctions when laws are violated and it is the threat of these sanctions that persuades most road users to comply.

Enforcement discourages people from repeating behaviour that has already earned them a sanction. A high level monitoring both enables drivers whose behaviour is dangerous to be identified and punished. It also has a positive influence on the behaviour of all road users and makes it possible to evaluate the extent to which users comply with the regulation for each type of regulation checked. The role of road check is both to punish and prevent, they may be used to educate, that is, when drivers are shown the offences they have just committed. This type of check allows offending drivers to be immediately aware of their own behaviour and of the risk they incur as well as the risk to others. The technique of road checks, Yannis et al. (2004) described as stationery enforcement or physical policing where police check drivers along the road and stop offenders. This system makes use of manned (visible or invisible) observation unit and a manned (visible) apprehension unit where the offenders are stopped. According to Yannis, traffic enforcement is not a stand-alone measure, and to maximize its effect, it must be supported by credible speed limits and publicity and embedded in a supportive legislative framework and sanctions. Traffic enforcement is most effective when it is unpredictable and difficult to avoid, where there is a mix of highly visible and less visible activities and when continued over a long period of time and should focus on roads, situations and times where speeding is considered to affect the road safety the most.

Other methods used by the police MTTU are motor traffic control in Ho Township, highway and night patrol, accident investigation and the provision of road safety education. Traffic law enforcement influences driving behaviour in two ways as indicated by Zaal (1994), general and specific deterrence. General deterrence is the impact of the threat of legal punishment and specific deterrence is the impact of the actual legal punishment on those who are apprehended. ACT 683 will be successful if it creates a meaningful deterrent effect on road users and its

success is in the level of enforcement. One of the measures that ensure success of enforcement action in traffic issues is increased surveillance. In Ghana there appear to be highly visible police presence on our roads but this only have minimal effect on road user behaviour. This is because the police are perceived to be officers who harass people and who take bribe and leave the offending drivers to continue with their bad behaviours. In order to improve the perception of the public about the police and increase deterrence there is the need to reduce the size of enforcement tolerance levels to ensure greater adherence to the traffic rules and regulations.

5.6.3 Regulatory and Enforcement – DVLA

The Driver and Vehicle Licensing Authority (DVLA) is mandated to promote good driving standards and ensuring safety of vehicles on the roads. Findings revealed that it does this through testing of drivers of motor vehicles and issue of driving licenses, renewal and upgrading of driving licenses, inspection, testing and registration of motor vehicles and issue and renewal of vehicle registration and examination certificates.

The regulation and enforcement are guided by a policy, and there are requirements and procedures to be followed to ensure safety of the learner driver and other road users. The policy guideline try to ensure the safety of all road users and mandates the DVLA work within a certain framework such as the type of category of license to be issued to a new driver. There are requirements, such as the minimum age, a minimum level of education and the physical and mental abilities of the driving license applicant. All these measures ensure that the applicants are mature enough, can read, comprehend and write simple English and are fit for the driving task. Licensing system is to prepare new drivers for their task of driving. If the licensing systems are fully effective then new drivers would be no more at risk than more experienced drivers.

The DVLA in an effort to regulate the issue of driving license gives a restricted license to a person who is learning to drive but has not yet satisfied the requirements necessary to obtain a driver's license and this is valid for a period of three (3) months, but can be renewed after that period. There are also procedures which must be followed in licensing a driver and renewal of driver's license and they all have safety measure in them so as to make the roads safe for all users. Apart from practical driving test that the applicant has to go through to show competence, the applicant also has to pass a theoretical test by identifying and interpreting road signs and markings since even though these languages guarantee safety, they are not self-enforcing. According to McKenna (2006), the fact that throughout the world new drivers are significantly more at risk indicates the extent of the needed improvement in the licensing system and the effectiveness of the system might be measured by the magnitude of the extra risk faced by new drivers.

IMAS (2006) explained that the driver condition is the most important of the six accident conditions; the others are light, weather, road, traffic, and vehicle. A driver in top physical, mental and an emotional shape can adjust to all the other conditions and to the errors of other drivers as well. It is therefore, a source of concern in terms of safety on the roads if a driving license applicant sits in the comfort of his home and obtains a driving license without going through the procedures of licensing a driver. Such a driver is a threat to himself and other road users. It will also be unfair and unsafe on the part of a licensing officer who will issue a driver's license to any applicant that did not go through the procedure of obtaining a license either for monetary gain or otherwise. The DVLA renews the license of all commercial drivers. The existing Legislative Instruments, LI 1663 of 1999 made it mandatory for the renewal of the new driver's license every two (2) years from the date of issue even though the driver's license

expires six years after the date of issue. There is safety issue built in the process of renewing driving license, especially the mandatory eye test. The DVLA could devise means of sending renewal notices to all individuals some days prior to the expiration of their current driving license. Drivers caught driving without a driver's license either because they do not have one; it has expired or is not valid for the vehicle driven risk to be arrested and they could be warned, prosecuted or the vehicle impounded for period of time. This will serve as deterrence to other drivers and also make vehicle owners to ensure that persons driving their vehicle have valid driver's license.

A driver's license holder may request to upgrade his/her license from a lower category to a higher category. It is the policy in Ghana that the applicant must be present and must have held the current category for not less than two years. This is to ensure that the applicant have enough experience in the present category before moving to a higher category. License B is normally issued to new drivers and it permits the holder to drive only cars and 4x4 cross country vehicles. A person with this license and desirous to drive commercial vehicle is only permitted to drive a taxi. It is not allowed for a license B holder to drive a mini bus and other commercial vehicles since they do not have the experience and competences needed to drive those vehicles.

To upgrade driver's license, the applicant has to go through written driving test, road signs test and in-traffic test to make sure he/she has the capacity, necessary skills and competences needed to drive the vehicles in a higher category. These are built-in safety mechanisms in terms of qualification as a driver and having a valid license. However, it was observed from the findings that some of the commercial drivers started driving commercial vehicles rather than Taxi soon after they were licensed even though their license did not qualify them to drive those vehicles.

Some even drive without any valid driving license. Most of these are drivers who exhibit unsafe behaviours on the roads since they do not have the skill and competences to drive those vehicles. Police enforcement, publicity and education must be intensified to discourage drivers with lower category license from driving vehicles with higher categories as they stand the chance of endangering their lives and that of other road users.

One of the functions of DVLA as revealed by the findings is the testing and registration of motor vehicles and this involves physical inspection of the vehicle. The inspection and test of the vehicle ensured that the vehicle is safe to the standard of the country and when it is registered its driver, passengers and all other road users will be safe on the roads. Vehicle condition affects the driver's ability to control it, the ability to see and be seen and to communicate with other drivers and pedestrians. The chances of a driver staying out of an accident are better with a vehicle in tip-top condition than they will be with one that has operational defects.

The DVLA issues vehicle examination certificates (roadworthy certificate) as part of its function as shown by the findings. It is mandatory that all vehicles are physically examined before issued with roadworthy certificates. The vehicle is taken to the garage for examination of its parts and anything that matter for the safety of the vehicle. All these are done to make sure that the vehicle is in good condition to ensure the safety of its driver, passengers and other road users. Since commercial vehicles are always on the roads they are more frequent than private vehicles examined, that is twice in a year. It will be a bad practice and unsafe behaviour on the part of a driver or vehicle owner or licensing officer to renew the roadworthy certificate of a vehicle without physical examination of the vehicle as revealed in the study.

5.6.4 Reinforcement

Reinforcement was used by Lonero et al. (2007) as an umbrella term to include incentives, rewards and other aspects of behaviour analysis techniques such as prompts and feedback. It focuses mainly on encouraging desirable behaviours rather than discouraging undesirable behaviours. The findings showed that majority of the commercial drivers have not had any incentive or reward since they started driving. Encouraging safe driving behaviour is not just about punishing unsafe driving with penalties through enforcement of the road rules, but also about rewarding safe driving. Safe driving benefits the entire community by making roads safer for all road users including cyclists and pedestrians.

As an intervention to reduce deaths and serious injuries from driving in North America, James (2007) reported that economic incentives were given to drivers who remain accident free, such as, added insurance cost for accident prone drivers, increased incentives or insurance reduction for accident free drivers and special benefits accruing to enrolling in refresher courses and other self-improvement activities. Motivation is central to every business and it is what gets people out every day, determined to deliver their best performance and achieve their goals. Goldenbeld (1995) pointed out that traffic enforcement was essentially an extrinsic motivational approach that relies on negative, external factors like fear of punishment, to change drivers' behaviour. This he said would diminish the intrinsic motivation of drivers to conform to the law, because they want to. The use of punishment instead of reward, Goldenbeld believed, could be considered as a one-sided psychological approach. He stated further that if traffic enforcement was supported by social norms in a society, visible police enforcement operations would remind road users of the importance of rules and urge them to comply with traffic rules. Even though, at first, rule compliance may be extrinsically motivated by the aim to avoid punishment, later on

drivers may actually change their personal belief about what is the right behaviour and internalize traffic rules.

As defined by United Nations Economic Commission for Europe (UNECE, 2010), road safety campaign is a set of communication measures for the purpose of obtaining good behaviour from road users or the modification of behaviours that has been incorrect until now. The campaign to motivate drivers should target the relevant aspects of attitudes that determine a specific type of behaviour and the message should be transmitted in such a way that the recipient feel concerned, or motivated to reflect and ultimately to change his behaviour. While education and public information are necessary, they need to be part of a comprehensive strategy, and seem to work best when linked with highly visible enforcement efforts.

5.6.5 Education

Road safety education is to ensure that all road users develop appropriate attitudes and safe behaviour and this can be achieved by imparting knowledge and appropriate skills to road users as they pass through life. Driver education should be informative, easy to understand and provide the driver with the ability to self assess their own driving behaviours and habits. The findings showed that NRSC is the lead agency in road safety in Ghana and undertakes nationwide planning, development and implementation of road safety programmes and activities.

The NRSC ensured road safety by carrying out road safety education in basic schools. NRSC, in its National Road Safety Survey Report (2007), identified child safety as an emerging road safety issue because of the significant representations (23 percent) of child fatalities in road traffic crashes in Ghana (NRSC Annual Report, 2010). In view of the above, the NRSC as part of its long term policy on safety of children tried to incorporate road safety education into formal academic curriculum. Prior to achieving this, the NRSC has been carrying out road safety

education and training programmes for selected schools. Manuals for teaching road safety lessons and road safety learning materials for school children in basic schools were prepared. Some of the behaviours targeted are roads and their uses, keeping safe on the roads, safety on a bus, road signs, crossing drills, child safety in cars/trotro/bus among others. The school programme aimed at instilling positive road user behaviour among young ones. This is in line with recommendation by United Nations Economic Commission for Europe (2010) that road safety education should start at pre-primary by parents, in primary and post-primary levels and continue in the secondary and finally in training and examinations for acquiring driving license. The early steps, they said in road training will contribute substantially to safe behaviour in adolescence and later on in life.

The NRSC, as shown by the findings uses targeted campaigns in educating road users. Four targeted campaigns were carried out and they included exceeding speeding limits in towns, driving under the influence of alcohol and drugs, driving tired/fatigue and campaign to promote increase in seatbelt and crash helmet usage. These were affirmed by the NRSC to be the most common contributory factors to human error related crashes in Ghana. This conforms to major reviews by OECD (1999) which concluded that enforcement targeted at a limited number of high risk violations was more effective in reducing road crashes than non-targeted general enforcement and the same applies to road safety education. There were various reasons for the targeted campaigns, such as the potential of the organization. Given the limited amount of manpower and equipment of NRSC, the education providers will always aim to get maximum value from scarce resources. Focusing on a limited number of high risk violations was more efficient than a non-focused general education approach. Road safety education focusing on one or more high risk violations such as speeding, drink driving, seatbelt use and red light running

was also justifiable given the scientific evidence of the relationships between these violations and road safety risk. In terms of communication, it was easier to communicate to road users about a limited and specific number of violations than about traffic violations in general.

The NRSC also uses community outreach to educate road users. Varying programmes ranging from carnivals, quiz competitions, exhibitions, durbars and multi-media activities on board public transports, street education programmes, visits to churches and mosques, delivery of talks, seminars and road side engagement with motorists were the methods used in the outreach programmes. Community outreach programmes help provide regular awareness and information campaigns to alert the public about the consequences of disregarding road traffic rules and regulations and provide information on the existing road traffic laws, the penalties and the measures that can be taken to prevent road traffic accidents. This could be complemented by community-based programmes to target high risk groups in the work place and in their local communities, and general public education to provide constant learning and communication opportunities to all road users.

Information and publicity are some of the educational approaches used by the NRSC. Information and publicity materials, outdoor publicity using bill boards, electronic and print media, and public engagement through road safety call centers were the methods adopted. Public information campaigns are used to raise awareness, to educate and inform, and to support policies and enforcement efforts.

Several factors should be considered when selecting programme delivery methods. These factors are the target audience; the educational objective; the type and content of the message being provided; the characteristics of the delivery method; the method's utility for providing

desired learning support. In programme delivery system, the methods considered experiential are those that allow the learner to gain experience with or to "feel" the information presented and include, audio and video cassettes, audio and video compact disks, method and result demonstrations, tour, field day, workshop, role play, case study. Reinforcement delivery methods provide informational, emotional or social support for the learner to facilitate learning and enhance or maintain the motivation to continue in the learning process such as fact sheet, notebook, leaflet or flier, pamphlet or booklet, magazine and journal articles, newsletter, home study kit. The programme delivery method that provide the learner opportunities to discuss, clarify, or otherwise gain greater understanding of new information can be classified as integrative methods. These methods generally provide opportunities for learners to merge new information with their existing knowledge and include conference, convention, seminar, panel, symposium, dialogue, discussion group, brainstorming, listening team, interview, personal and office visit. Other methods such as broadcast, television, radio, newspaper, movie (film), slide-tape presentation, photograph, bulletin board, show, fair, exhibit, lecture, speech, church bulletin, meeting, poster, book are applicable in a wide variety of systems or that can be used for limited or special situations.

In brief, professional driver education and training should assist in developing skills and knowledge in all aspects of learning to drive, defensive driving techniques, road law knowledge, awareness of the traffic environment, driver behaviour and attitude, the ability to self assess driving and interaction with other road users. Driver education and training services should offer driver education and training suitable for learner and licensed drivers.

The road safety management approach and methodology used by the NRSC to improve road safety in Ho Municipality were built around pre-crash, crash and post-crash interventions

involving education, engineering, enforcement and emergency response services. This approach is recommended by World Bank and OECD as indicated by Land Transport Safety Authority (2000) and Bliss & Breen (2008). According to them road safety is produced just like other goods and services and the production process is viewed as a management system with three levels: institutional management functions which produce interventions, which in turn produce results. The institutional management functions relate to all government, civil society and business entities that produce interventions. Interventions cover the planning, design and operation of the road network, the entry and exit of vehicles and users into the road network, and the recovery and rehabilitation of crash victims. The results are the targets and they specify the desired safety performance endorsed by governments at all levels, stakeholders and communities.

5.6.6 Challenges of Approaches to Changing Driver Behaviour

A considerable number of road safety regulations in Ghana are outdated. Some of the principal road safety legislations which are currently in use have been in existence since 1974 and the latest one, Act 683 was enacted in 2004. Some of the laws are based on assumptions about outdated automotive technology and have never been reviewed as technology improved. It is necessary to review the scope of the legislative framework periodically so that they will match the road safety needs of the present with due consideration of cost, effectiveness, particularly public acceptability as indicated by Bliss and Breen, (2008).

There is lack of adherence to most of the existing Acts, regulations and by-laws. Acts, regulations and by-laws are made to reduce road traffic accidents. However, most motorists and other road users disregard these rules and regulations resulting in unnecessary loss of life and property through road accidents. Lack of adherence can also be attributed to lack of awareness

on road safety. This can be overcome by intensifying police patrols and road checks to ensure that all erring motorists are arrested and prosecuted. Ghana Highway Code, Road Traffic Act 683 and other Legislative Instruments on road safety should be circulated among motorists free of charge. This will help increase the knowledge of the motorists on traffic rules to reduce the number of deaths resulting from careless driving. Formation of road safety committees in the regional and district levels and road safety clubs in communities and schools will help to inculcate safety culture among the young minds and the importance of adherence to road rules.

There is absence of a regulatory authority to enforce compliance by stakeholder institutions. Road safety activities are marked with intervention measures involving policy direction, education, information and publicity programmes, road engineering measures, enforcement of road traffic laws and emergency response/healthcare for accident victims. These are undertaken by eight key road safety stakeholder institutions. However, there is no regulatory body to enforce compliance by these institutions, as a result, if any institution fails to do its work well it goes to affect the entire road safety management system. There is the need for a regulatory body to sanction non-performing institutions, since all elements of the road safety management system and the linkages between them are critical for Ghana seeking to improve its current performance levels. The NRSC as a statutory public agency responsible for planning, development, promotion , implementation and coordination of road safety activities should be mandated to demand performance from stakeholders and issue sanctions where necessary.

There are inconsistencies in offence charging and prosecution of road safety violations and subjective interpretation of existing road traffic laws and regulations. Currently, there are too many traffic laws which are intended to protect drivers from themselves even when they are the

only ones likely to suffer adverse consequences such as seatbelt and helmet laws. Also, enforcement of traffic laws often has two little impact on risky driver behaviour and this undermines public confidence in the police and legal system. Enforcement of traffic laws is at times vindictive and oppressive, especially on commercial drivers. Traffic laws that reflect the behaviour of the majority of motorists have a better compliance than laws that arbitrarily criminalize the majority of motorists and encourage violations. The normally careful and competent actions of a reasonable person should be considered legal. Road traffic laws should be set so that the majority of motorists observe it voluntarily and enforcement can be directed to the minority of offenders. All traffic laws should be reviewed to ensure the priority is on safety of others, not the safety of the driver and the highest enforcement priority must be driver behaviour that infringes on the rights of others, particularly if it risks their death or injury.

The Police MTTU, DVLA and NRSC are challenged by limited logistics and personnel to carry out effective enforcement, regulation and education on road safety. Inadequate enforcement of road traffic laws and regulations could be attributed to insufficient capacity and resources to deal with road traffic situations. The police MTTU lack devices and equipment such as speed radar guns and alcometers. Without these devices it will be difficult for the Police to detect, prevent, arrest or prosecute any of the traffic offences. Improvement could be achieved by providing the police with logistics and the capacity enhanced by incorporating in the police training curriculum courses on enforcement and road safety issues. Deficiencies on vehicles are not effectively checked by the DVLA as a result of inadequate logistics and personnel. This could be improved by providing the necessary tools to staff to enable them conduct roadworthy checks on vehicles. The NRSC is also not able to adequately fund and carry out public education due to constraints of logistics and capacity. To be able to sustain public education, key players in road safety

should try and make provision in their budgets to conduct education to supplement NRSC's efforts since road safety is a shared responsibility. NRSC should provide more funds to its regional offices to carry out their activities effectively.

There are high attrition rate of trained traffic enforcement personnel and lack of specialist training in road traffic regulations. This is because the current enforcement unit, MTTU, is considered a normal part of the operations of the Ghana Police Service with regular rotation of staff. As a such, after training police MTTU officers in the enforcement of traffic rules they are transferred to other duties. This results in lack of a structured enforcement programme by the MTTU that often leads to inconsistencies in traffic law enforcement practices and tactics.

There is political interference in the operations of the police MTTU, DVLA and NRSC in the discharge of their duties. This is because when some drivers, especially commercial drivers are arrested for committing traffic offences, people in high offices intercede on their behalf to be released. This encourages the offending driver to repeat the offence or to disregard safety rules on the roads.

The DVLA has been grappling with some challenges that confront it. Drivers with licenses and skills for smaller vehicles were found driving heavy-duty vehicles without any proper training or certification; this is a safety concern as they do not have the necessary skills and competences to handle emergencies if they should be confronted with one. Many drivers secure fake driving licenses from the activities of middlemen who defraud unsuspecting driving license applicants.

In summary, the demographic characteristics of the commercial drivers in terms of age and educational levels favour good safety practice. However, most of them trained through various informal arrangements which gave course for concern in terms of safety. Most of the

commercial drivers have poor knowledge of road traffic rules and regulations; they mostly perceived the police MTTU and DVLA to be effective in the enforcement and regulation of road traffic rules, even though some of them had some reservations about their performance. Most of the commercial drivers have not had any incentive or reward as a form of motivation and majority have also not attended any driver education or training since they started driving. The commercial drivers in their operations faced challenges and these included lack of defined condition of service, issues of 'floating drivers' who mainly flout road traffic rules, lack of professional education and training opportunities for drivers in Ho Municipality and increasing numbers of armed robbers on the roads, especially in the night.

There are comprehensive legislation on road safety, 'The Road Safety Act, 2004', Act 683 and Legislative Instrument which defined the offences, the enforcement actions and the penalties for violation so as to make the roads safe. The police MTTU exist to enforce road traffic rules and regulations and the DVLA exists to ensure best practices of licensing drivers and vehicles to promote road safety. The NRSC has a strategic objective to provide leadership in development and implementation of measures that will reduce road traffic accidents. The police MTTU have strategies to enforce road safety, the DVLA have approaches to regulate and enforce road traffic laws and the NRSC and its key stakeholders also have methods of providing education and training to all road users. But these institutions faced challenges in the discharge of their duties and these included insufficient capacity and resources to deal with road safety situations and these resulted in inadequate enforcement, deficiencies in vehicle fitness and inadequate provision of public education on road safety.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.1 Introduction

This chapter provides a summary of the research and conclusions drawn from the findings. It also covers recommendations made on the basis of the findings and their implications to road safety.

6.2 Summary of the Study

6.2.1 Demographic Characteristics of Commercial Drivers

Generally, the demographic characteristics of the commercial drivers in terms of age distribution and educational level, favoured good safety practice. The majority of the commercial drivers were adults in the active and responsible working age group and could accept and be able to practice good safety culture. They meet the stipulated minimum educational requirement which was set by the DVLA although their educational levels were low. The demographics were good in terms of safety on the roads because road transport passenger services are predominantly provided by commercial drivers, and by their sheer numbers are involved in multiple vehicle accidents, which cause high rates of deaths and injuries to themselves and other road users.

6.2.2 Driving History

Learning by apprenticeship is the commonest mode of training for commercial drivers and they trained through various informal arrangements. The majority of the commercial drivers have more than 5 years experience in the driving profession and as a commercial driver. They have driving license issued and renewed by the DVLA, and the majority also upgraded their license at DVLA, although some obtained and upgraded their license through agents. The majority of them sent their vehicles physically to DVLA or licensed private garages for examination before renewal of road use certificates as required. However, some drivers renew their road use

certificates through agents which are of serious safety concern. The level and mode of commercial driver training has a link with accident situations because the excess accident liability of newly qualified drivers is a widely recognized problem. Well trained drivers are expected to be less involved in accidents situations than poorly trained drivers. Training approaches should rely largely on attempt to equip learners with the 'good stuff' they require to be a safe driver such as 'driving lessons' and/or 'driver education.'

6.2.3 The Perception of Commercial Drivers about Approaches to Changing Driver Behaviour

Commercial drivers are expected to be knowledgeable about road traffic rules and regulations, police enforcement and DVLA regulation of road traffic rules and opportunities of driver education and training. However, the findings revealed poor knowledge of commercial drivers on road traffic rules and regulations; they were able to mention only a few of them. The mode of training and level of education had no effect on their knowledge of road traffic rules and regulations. For legislation to be effective in setting socially acceptable standards and sanctions to be imposed on violation, those for whom it is intended must be knowledgeable about it.

The findings revealed that the majority of the commercial drivers perceived the MTTU to be effective in the performance of their duties while few had some misgivings about their performance. The findings revealed further that motivation for enforcement serve as a barrier to road safety in Ho Municipality as some commercial drivers accused the police MTTU of corruption by extortion (demanding money for not processing people for court for committing traffic offences) and bribery (accepting money from drivers in exchange for not enforcing the law). The commercial drivers also supported public perception of the role of the police as barrier to road safety. They accused the police of always harassing them instead of running after armed

robbers on the highways. There are other risk behaviours demonstrated by commercial drivers such as mobile phone use, fatigue, running red lights and tailgating which are not effectively enforced by the MTTU even though they are also risk factors to road safety.

The findings showed that the majority of the commercial drivers perceived the DVLA to be effective in the execution of their duties but a few had some misgivings: the registration and licensing of motor vehicles, licensing of drivers of motor vehicles and tests of vehicles and issue of road use certificates are done by the DVLA. There are unauthorized persons ('goro boys') who loiter around the premises of the DVLA looking for customers whom they assist in procuring vehicle document for a fee and may be suppliers of fake licenses and other documents to unsuspecting drivers. This however, is not very common in DVLA office in Ho. There were also allegations of some officials of the DVLA collecting money from driver's license applicants who failed their test or examinations by passing them.

The findings from the study disclosed that the majority of the commercial drivers have not had any incentive or reward since they started driving, but this did not discourage most of them from attending driver education or training to improve their knowledge and skills on road safety. Some commercial drivers were given incentive or reward in the form of rice, cloth or money by their union leaders, but they were, however, not motivated to attend driver education or training to improve their knowledge or skills. NRSC together with the DVLA and the Police seldom organize best driver award for commercial drivers and deserving drivers were rewarded. Even though individual drivers competed for their Unions, the award normally goes to the Union, not the individual drivers.

The findings from the study revealed that about half of the commercial drivers interviewed have not attended any driver education or training since they started driving. For those who attended driver education/training the findings showed that driver education and training were provided by various organizations such NRSC in collaboration with either DVLA or Police MTTU or both of them. The Transport Unions and some private companies also provided education and training for their drivers. The only direct benefits imparted by broad driver education and training of new drivers appears to be the basic vehicle control skills and knowledge of road rules necessary for entering the driving population. It takes much longer for them to develop higher-order perceptual and cognitive skills which are necessary to safely interact in the driving environment.

The findings showed that road safety practitioners used different methods to provide education and training for commercial drivers such as targeted campaigns, community outreach, driver training, and information and publicity. They targeted specific knowledge, skills and behaviours like roads and their safe uses, crossing drill, child safety in cars, "trotros" and buses, exceeding speed limits, driving while intoxicated, mobile phone use while driving, fatigue, seatbelt and crash helmet use, existing road traffic rules and regulations, consequences and penalties of violation of traffic rules, causes, effects and prevention of road traffic accidents. Defensive driving, driving under hazardous conditions, observance of road signs and markings, overloading of vehicles, wrong overtaking and respect for other road users.

The findings revealed that commercial drivers who attended driver education and training said they reminded them of road safety rules and regulations and as a result they were more attentive and cautious when driving, they do not exceed speed limits and respect road signs and markings and these had paid off because they have not been involved in any accident.

6.2.4 Challenges Faced as a Commercial Driver

The findings indicated bad nature of the roads in the Municipality in terms of potholes, poor signing and markings and numerous speed humps some of which were constructed by people in some towns and villages which cause travel delays, fatigue and destruction of vehicle parts resulting in frequent breakdowns and accidents. Drivers of 'floating vehicles' were also said to be those who normally resort to bad driving behaviours such as loading and off-loading passengers at any place, over-speeding to hunt for passengers, drink driving and over-loading of vehicles. There were no defined conditions of service for the commercial drivers and they were not on any proper salary scale, no personal insurance in case of an accident, no health care, no retirement benefits or social security paid on their behalf by their vehicle owners even though there is a legal provision on behalf of all workers both formal and informal. Commercial drivers did not have professional education and training opportunities in Ho Municipality to provide professional drivers with refresher courses.

6.2.5 The Aim and Objectives of the Approaches to Changing Driver Behaviour

The findings showed that Ghana has a comprehensive legislation on road safety, 'The Road Traffic Act, 2004', Act 683, and other legislative instruments (LI) which defined the offences, the enforcement actions and the penalties for violation so as to ensure safety on the roads. The police MTTU exist to enforce road traffic rules and regulations to ensure safety on the roads while the DVLA exists to ensure best practices of licensing drivers and vehicles to promote road safety. Reinforcement includes incentives, rewards and other aspects of behaviour analysis techniques such as prompts and feedback and focuses mainly on encouraging desirable behaviours rather than discouraging undesirable behaviours. The NRSC also has a strategic

objective to provide leadership in the development and implementation of measures that will reduce road traffic accident fatalities on a year-on-year basis.

6.2.6 How the Approaches Ensured Road Safety

The findings showed that legislation on road safety spelt out the condition under which a person would be said to have committed a road traffic offence. These were divided into seven sections: principal road safety provisions; restrictions on road use in the interest of road safety; registration and licensing of motor vehicles; licensing drivers of motor vehicles; tests of vehicles and issue of road use certificate; licensing of commercial vehicles; and miscellaneous offences and general provisions. The 'Road Traffic Act' took into consideration the level of severity of the offence and it is based on these that penalties are imposed on a person who is liable on summary conviction to a fine of a number of penalty units, term of imprisonment, or to both. In the case of dangerous driving the court may upon conviction order the payment of compensation to an injured person or property, or order the withdrawal of driving license for a period between 3 and 5 years.

The findings showed that the police MTTU ensured safety on the roads through road checks in accident prone towns and villages to make certain compliance with speed limits and drink driving. They also used road checks to ensure compliance with regularization of vehicle documents, license of drivers and overloading of vehicles. Other methods used by the police MTTU were motor traffic control in Ho Township, highway and night patrol, accident investigation and the provision of road safety education.

Findings revealed that the DVLA regulated drivers and enforced road traffic rules and regulations through testing of drivers of motor vehicles and issue of driving licenses, renewal and upgrading of driving licenses, inspection, testing and registration of motor vehicles and issue

and renewal of vehicle registration and examination certificates. The regulation and enforcement were guided by policies, and there were requirements and procedures to be followed to ensure safety of the learner driver and other road users.

Reinforcement included incentives, rewards and other aspects of behaviour analysis techniques such as prompts and feedback. The NRSC together with some insurance companies seldom organized best driver award for commercial drivers. The NRSC also celebrated annually road safety week and as part of the celebration awarded deserving transport unions after the competition.

The findings showed that NRSC was the lead agency in road safety in Ghana and undertook nationwide planning, development and implementation of road safety programmes and activities and ensured road safety by carrying out among other functions road safety education in basic schools; targeted campaigns; community outreach; information and publicity in educating road users. The road safety management approach and methodology used by the NRSC to improve road safety in Ho Municipality were built around pre-crash, crash and post-crash interventions involving education, engineering, enforcement and emergency response services.

6.2.7 Challenges of the Approaches to Changing Driver Behaviour

The findings showed that considerable number of road safety regulations in Ghana was outdated; there was lack of adherence to most of the existing Acts, regulations and by-laws; there was absence of a regulatory authority to enforce compliance by stakeholder institutions; and there were inconsistencies in offence charging and prosecution of road safety violations and subjective interpretation of existing road traffic laws and regulations.

The findings revealed that Police MTTU, DVLA and NRSC were challenged by limited logistics and personnel to carry out effective enforcement, regulation and education on road safety. There

were high attrition rate of trained traffic enforcement personnel and lack of specialist training in road traffic regulations. There was political interference in the operations of the police MTTU, DVLA and NRSC in the discharge of their duties. Drivers with licenses and skills for smaller vehicles were found driving heavy-duty vehicles without any proper training or certification.

6.3 Conclusions

In relation to the objectives of the study, some conclusions could be drawn. The demographic characteristics of the commercial drivers in terms of age distribution and educational level favour good safety practice because they were all matured and educated to take safety precautions. However, the level of education of the drivers was very low in terms of psychological appraisal, quick thinking, understanding and comments on road safety issues and reading to understand and own copies of road regulations. With the innovations in technology, the vehicle, the road and the driving environment are becoming more complex requiring upgrading of knowledge and skills to be able to cope with modern technology and this require higher academic attainment.

The commercial drivers were trained mainly through informal means, such as apprenticeship. This type of driver training concentrates on basic vehicle control skills and road law knowledge and is heavily oriented towards initial driver licensing, as a result, does not guarantee safe or crash free driving on the part of those trained, it also contributes little to post-license reductions in casualty crashes or traffic violation among drivers. Since most of the trainees were not taken through any proper road safety rules and regulations they have poor knowledge of road traffic laws and they are bound to commit violations which could be detrimental to other road users. The few commercial drivers who obtained, renewed and upgraded their licenses and renewed their roadworthy certificates through an agent posed road safety problems, because, before issue of driving license, renew and upgrade license, applicants were taken through examinations and

tests to prove their competences and vehicles were also physically examined to be roadworthy before issued with certificates.

There is comprehensive legislation on road safety which set socially acceptable standard for safety on the road and also sanctions to be imposed on violation with the aim of reducing the potential for death and injury to innocent road users – passengers, pedestrians, cyclists, motor-cyclists and safe drivers – to a level that is reasonably proportional to the need for an efficient transport system which must be decided by society. Enforcing traffic laws and deterring drivers, particularly commercial drivers, from engaging in behaviour that increases crash risk is an effective way of reducing crash risk in respect of drunk driving and speeding behaviour. Targeted deterrence and enforcement measures have a great probability of changing driver behaviour. However, road traffic crashes were increasing despite efforts being made to reduce it because of inadequate enforcement of road traffic rules and regulations. The Road Traffic Act, (Act 683), provided for comprehensive regulation of roads to ensure safety and the police MTTU who were mandated to enforce it have good strategies. However, insufficient capacity and resources to deal with the situation impeded their activities. Even though the unit was under staffed, they were transferred out of the unit and sometimes without replacement. Management and handling of motor traffic was also not taught at the police training schools to enable police personnel to carry out road safety duties efficiently and effectively. As a result, the unit undergoes on-the-job training and this could affect negatively handling of motor traffic situations and result in inadequate enforcement.

The DVLA was mandated to carry out regulatory and enforcement of road traffic laws. The Road Traffic Act, 2004 made provision for registration and licensing of motor vehicles, licensing of drivers of motor vehicles and tests of vehicles and issue of road use certificates. The

regulatory function was performed quite effectively as indicated in the study, but it scarcely carries out its enforcement duties. The contribution of vehicles to accidents was attributable to the state of the vehicle. The laws of Ghana mandated that vehicles allowed on the roads are assessed as being road worthy. However, the DVLA sometimes failed to address some of the problems relating to vehicle fitness due to lack of tools and personnel. Road worthy tests for instance were done visually and this unscientific approach would not result in proper testing of vehicles, as such the safety of some of the vehicles could not be assured. The involvement of 'middlemen' in the activities of the DVLA also resulted in the issue of fake licenses and other vehicle documents and this endangers the lives of road users.

The best behaviours in drivers can be brought through recognition and rewards. Incentive programmes work because they focus attention on specific areas such as safe driving. They reinforce desired behaviours by rewarding and recognizing a job well done. Rewards may be more effective than punishment in motivating for safety. Punishment brings negative side effects such as a dysfunctional social climate, a climate of resentment, uncooperativeness, antagonism and sabotage; as a result, the very behaviour that was to be prevented may in fact be stimulated. Punishment may increase the inclination to beat the system, for instance, drivers whose licenses have been suspended or revoked continue to drive. In contrast, incentive programmes for safety have both the effect for which the intended (greater safety) and usually the positive side effect of creating a more favourable social climate.

The NRSC together with its key stakeholders undertook various road traffic accident interventions through different activities at the national and regional levels, but there seemed to be inadequate driver education and training. Driver education and training programmes could be part of Transport Unions and Transport companies' workplace health and safety programme and

should reflect a genuine and ongoing commitment to safety. While improving driver knowledge and skill are important, they do not always lead to change in on-road behaviour or reduce crash risk among drivers. On-road driving experience is the medium through which higher order cognitive skills related to driving (hazard perception) are developed and maintained.

In general, each of the approaches – legislation, enforcement, reinforcement and education – works better when used in combination with one or more of the others. The effectiveness of legislation depends on how its implementation is managed in conjunction with other initiatives such as enforcement and education.

6.4 Recommendations

Based on the major findings, the following recommendations were made:

- The study showed clearly that the level of education of commercial drivers was very low, and with the innovation in technology, it is recommended that driver education and training programmes should be included in the transport unions' and companies' planning process so that the necessary funding and other resources are made available to enable drivers to access timely and appropriate education and training. The most appropriate education and training programme should be identified through training needs analysis.

  Also, the transport unions and companies should establish parameters and policies for remedial driver training for their members as part of ongoing risk management activities. There should be a system to identify those drivers in need of further driver training and/or remediation. The warning signs may include repeated traffic infringements, repeated "at fault" vehicle crashes, or frequent incidents involving risky behaviours. Remedial training when delivered on timely manner will ensure that the transport unions and companies meet their health and safety obligations and will help prevent more serious incidents from

occurring. The training may also identify very high risk drivers who do not respond to remedial training.

Road safety practitioners may also identify the need for refresher training in specific areas of skill as opposed to a full driver training. The refresher training may result from the need to address inexperienced or lack of recent experience; to allow drivers who have held a license for a long time to refresh road rules knowledge; to gain more confidence; and for older drivers to upgrade their skills and knowledge. An ongoing programme of re-assessment and refresher training will also usually be necessary for all drivers to make sure their skills continue to be up to date. Even if drivers often operate vehicles, there is the need for regular assessment of their competence and refresher training or more detailed training where necessary to ensure that the drivers maintain good driving habits; learn new skills where appropriate; and reassess their abilities.

- Basic driver training works at an instructional level where people are trained to drive by a driving school and/or informal systems such as driver apprenticeship, friends and relatives or a combination to achieve licensed driver status. The study revealed that the main mode of training of drivers in Ho Municipality was through the informal system which concentrated on basic vehicle control skills and limited road law knowledge. But this mode of training provides greater levels of supervised experience during the learning period than driving schools which have lower level and variety of traffic experience, but lack some aspects of professional training instructions; as a result, it is recommended that encouraging cooperation between driving schools and the informal driver training systems in the training of learner drivers may be beneficial in increasing the quality of instruction and the breadth and depth of learner driver experience.

- It was obvious from the study that the commercial drivers were not very knowledgeable on legislation on road safety. This may be attributable to unavailability of Road Traffic Act, 2004, Act 683 and Legislative Instrument on road safety to commercial drivers. It is recommended that Act 683 and Legislative Instruments on road safety be supplied for free or at subsidized prices and the amount incorporated into the fees for driving license applicants. This must be supported by education to improve the knowledge of new and old drivers so as to reduce the number of accidents and its associated death and injuries

- Having come out clearly that some of the road traffic laws were based on assumptions about outdated automotive technology and have not been reviewed as technology improved, it is recommended that there should be periodic review of Road Traffic Act and regulations.
- The study revealed that some commercial drivers engaged the services of middlemen or agents when dealing with the DVLA. It is recommended that commercial drivers be sensitized and encouraged by their union leaders to deal directly with the DVLA for the issue, renewal and upgrading of their driving license and the renewal of their roadworthy certificates so that they will not be duped and provided with fake documents by agents.

- The study showed clearly that commercial drivers were seldom given incentive or reward. It is therefore recommended that transport unions and companies as a means of improving the performance of their members should keep record of the activities of their members and introduce driver reward scheme where drivers with good driving records could be rewarded at the end of the year. Drivers whose driving records show that they have not committed any serious road safety related offences for a period of time could be rewarded with a token. Also, driving incentive programmes could be used to motivate commercial drivers to

improve their performance. The incentive should be such that deserving drivers earn bonuses as recognition for periods of outstanding safety performance and in recognition of safe driving. Transport company drivers such Metro Mass Transit and Inter-City State Transport who are paid salary by the company should be able to earn bonuses annually up to a percentage of their regular salary.

- The study revealed that the police MTTU, DVLA and NRSC lack the necessary capacity and resources to enforce and regulate road traffic rules. It is therefore recommended that there should be sufficient improvement of their capacity and resources for effective planning, development, promotion, implementation and coordination of road safety activities.

- The study revealed that road safety is a multi-faceted problem. It is recommended that everybody should mobilize to address the road safety crises which require political leadership, a systematic response, well orchestrated action and collaboration of government, business and civil society at all levels to achieve results. Every effort needs to be made to put an end to the massacre; road crash death and injury is predictable and avoidable.

6.5 Areas for Further Research

- The effectiveness of driver training as a road safety measure
- Effects of driver training on crash involvement, crash risk and driver behaviour

REFERENCES

Ajzen, I. (1991). The Theory of Planned Behaviour. *Organizational Behaviour and Human Decision Processes, 50, 179-211.*

Armitage, C., & Conner, M. (2001). Efficacy of the theory of planned behaviour: A meta-analytic review. *British Journal of Social Psychology*, 40, 471-499.

Bandura, A. (1997). Self-efficacy: The exercise of control. New York: Freeman.

Bandura, A. (1986). *Social Foundations of Thought and Action*. Englewood Cliffs, New Jersey: Prentice Hall.

Baumgartner, T. A., Strong, C. H., & Hensley, L. D. (2002). Conducting and Reading Research in Health and Human Performance (3rd Ed.). New York: McGraw Hill.

Bjornskau, T., & Elvik, R. (1992). "Can road traffic law enforcement permanently reduce the number of accidents?" Accident Analysis and Prevention, 24, 5, 507-520.

Bliss, T. (2004). Implementing the Recommendations of The World Report on Road Traffic Injury Prevention. Transport Note No. TN-1, Washington DC: The World Bank.

Bliss, T. and Breen, J. (2008). Implementing the Recommendations of The World Report on Road Traffic Injury Prevention Country guidelines for the conduct of road safety management capacity reviews and the related specification of lead agency reforms, investment strategies and safety programs and projects, Global Road Safety Facility, Washington: The World Bank.

Brown, I. D. (1997). How traffic and transport systems can benefit from psychology. In T. Rotherngatter & E. Carbonell Vaya (Eds). *Traffic and Transport Psychology*: *Theory and Application.* Amsterdam: Pergamon.

Denzin, N. K. (1970). The Research Act in Sociology: A Theoretical Introduction to Sociological Methods. London: Butterworths.

Dussault, C. (1993). "The Analysis Safety Products, Promotion, Legislation and Enforcement of Social Marketing." The Safety Network, 9, 1, 3-4.

Etzioni, A. (1975). A Comparative Analysis of Complex Organizations, rev. ed. New York: Free Press.

Fraenkel, J. R. & Wallen, N. E. (2003). How to Design and Evaluate Research in Education (5th Ed.). New York: McGraw Hill.

Geller, E.S. (1990) "Preventing injuries and deaths from vehicle crashes: Encouraging belts and discouraging booze." Social Influence Processes and Prevention, 1, 249-277.

Geller, E. S., Rudd, J. R., Kalsher, M. J., Streff, F. M., & Lehman, G. R. (1987). "Employer-based programmes to motivate safety belt use: A review of short-term and long-term effects." Journal of Safety Research, 18, 1-17.

General Accounting Office, (1991). "Highway safety: Motorcycle helmet laws save lives and reduce costs to society" (Report no. GAO/RCED-91-170). Gaitersburg, Maryland: General Accounting Office.

Glanz, K., Lewis, F. M., & Rimers, B. K. (Eds.). (1990). *Health Behaviour and Health Education: Theory, Research and Practice.* San Francisco, CA: Jossey Bass.

Global Road Safety Partnership, (2011). Road Safety in India: Situation and Projects.

http://www.grsproadsafety.org/page-india-27.html

Graham, J. D. (1993). Injuries from traffic crashes: meeting the challenge. Ann Rev Public Health.

Gregersen, N. P., Berg, H. Y., Engstrom, I., Nolen, S., Nyberg, A., & Rimmo, P. A. (2000). Sixteen years limit for learner drivers in Sweden – An evaluation of safety benefits. *Accident Analysis and Prevention*.

Grizzell, J. (2007). Behaviour Change Theories and Models. Retrieved January 28, 2007, from http://www.csupomona.edu/"jvgrizzell/best.practices/bctheory.html.

Godin, G, & Kok, G. (1995). The theory of planned behaviour. A review of its applications to health-related behaviours. *American Journal of Health Promotion, 11, 87-98.*

Goldenbeld, C. (1995). *Police enforcement: theory and practice.* In: PTRC, Traffic Management and Road Safety. Proceedings of Seminar G held at the PTRC European Transport Forum University of Warwick, England.

Harano, R. M., & Hubert, D.E. (1974). "An evaluation of California's 'Good Driver' incentive programmme" (Report No. 6). Sacramento, California. California Department of Motor Vehicles.

Hauer, E., Ahlin, F. J., & Bowser, J. S. (1982). "Speed enforcement and speed choice." AAP, 14, 4, 267-278.

Hutchins, C. (2008). Literature Review: independent driving in the driver training and on-road assessment protocols – building an evidence base. Transport Research Laboratory.

IMAS Limited, (2006*). Defensive Driving within driving environment.* Handout on seminar for members of Regional Road Safety Committees of the National Road Safety Commission, Accra. IMAS Limited.

International Transport Forum, (2008). "Towards Zero: Ambitious Road Safety Targets and the Safe System Approach," OECD.

http://www.internationaltransportforum.org/jtrc/safety/targets/targets/html

James, L. (2007). Principles of Driving Psychology. University of Hawaii.

Kendra, C. (2012). Social Learning Theory. An Overview of Bandura's Social Learning Theory. About.com Guide.

Kilbey, P. (2011). Reported Road Casualties in Great Britain: Quarterly Provisional Estimates. Statistical Release. Department of Transport.

http://assets.dft.gov.uk/statistics/releases/road-accidents-and-safety-quarterly-estimates-g1-2011/methodology-note-quarterly-estimates.pdf

Lonero, L. P., Clinton, K., Wilde, G. J. S., Roach, K., McKnight, A. J., MacLean, H., Guastello, S. J. & Lamble, R. W. (2007). Changing road user behaviour: what works, what doesn't. PDE Publications.

Lund, A.K., Williams, A.F., & Zador, P. (1986). "High school driver education: Further evaluation of the DeKalb County Study." AAP, 18, 4, 349-357.

McCartt, A. T., Shabananova, V. I., & Leaf, W. A. (2003). Driving experience, crashes and traffic citations of teenage beginning drivers. *Accident Analysis and Prevention*.

McKenna, F. P. (2006). *Changing driver behaviour?* Road Safety Congress. University of Reading and Perception and Performance. www.perceptionandperformance.com

Meyhew, D. R. & Simpson, H. M. (2002). *The Safety Value of Driver Education and Training.* Traffic Injury Research Foundation (TIRF). Ottawa, Ontario, Canada.

Meyhew, D. R. & Simpson, H. M. (1995). *The role of driving experience: implications for the training and licensing of new drivers.* Insurance Bureau of Canada: Toronto.

Miller, N.E. & Dollard, J. (1941). *Social Learning and Imitation.* New Haven, CT: Yale University Press.

Moskowitz, J.M. (1989). "The primary prevention of alcohol problems: A critical review of the research literature." Journal of Studies on Alcohol, 50, 1, 54-88.

National Highway Traffic Safety Administration, (1992). Position papers from the Third National Injury Control Conference: setting the national agenda for injury control in the 1990s. Washington, D.C.: U.S. Department of Health and Human Services, Public Health Services, CDC.

National Highway Traffic Safety Administration, (1998). Research note. National occupant protection use survey, 1996-controlled intersection study. Washington D.C.: U.S. Department of Transportation, National Highway Traffic Safety Administration.

National Road Safety Commission, (2006). Annual Report. Accra: Sakva.

National Road Safety Commission, (2010). Annual Report. Accra: Sakva.

National Road Safety Commission, (2010). Volta Region accident statistics for 2007 to 2009: Ghana Police Motor Traffic and Transport Unit, Ho, Volta Region.

New York City Department of Health and Mental Hygiene. (2002). Using Behavioural Science: Applying Theory to Practice. New York: New York City Department of Health and Mental Hygiene Programme Evaluation Unit.

Organization for Economic Cooperation and Development (OECD, 1986). "Effectiveness of road safety education programs." Paris: Road Transport Research.

Organization for Economic Cooperation and Development, (1999). Safety Strategies for rural roads. OECD, Paris.

Organization for Economic Cooperation and Development, (2008). Towards Zero: Achieving Ambitious Road Safety Targets through a Safe System Approach, OECD, Paris.

Pajares, F. (2002). Overview of social cognitive theory and self-efficacy.

http://www.emory.edu/EDUCATION/mfp/eff.html.

Peden, M., Scurfield, R., Sleet, D., Mohan, D., Hyder, A. A., Jarawan, E., & Mathers, C. (Eds.). (2004*). World report on road traffic injury prevention*. World Health Organization, Geneva.

Perry, C. L., Barnowski, T., & Parcel, G. S. (1990). How individuals, environments, and health behaviour interact: Social learning theory. In Glanz, K., Lewis, F. M., & Rimers, B. K. (Eds.), *Health Behaviour and Health Education: Theory, Research and Practice.* San Francisco, CA: Jossey Bass.

Preusser, D.F., & Lund, A.K. (1988). "And keep on looking: A film to reduce pedestrian crashes among 9- to 12-year-olds." Journal of Safety Research, 19, 4, 177-185.

Prochaska, J., Johnson, S., & Lee, P. (1998). The transtheoretical model of behaviour change. In S. Schumakar, E. Schron, J. Ockene & W. McBee (Eds.). *The Handbook of Health Behaviour Change*, 2nd ed. New York, NY: Springer.

Prochaska, J., & DiClemente, C. C. (1986). Towards a comprehensive model of change. In: W. R. Miller and N. Heather (Eds.), Treating addictive behaviours: Process of change. New York: Plenum Press.

Ramage-Morin, (2008). Canadian Year of Road Safety 2011. www.tc.gc.ca/roadsafety2011

Road and Maritime Services, (2011). *Road Safety Education Programme*. NSW Government, Transport and Maritime Services

Rothengatter, T. (1982). "The effects of police surveillance and law enforcement on driver behaviour." Current Psychological reviews, 2, 349-358.

Skinner, B. F. (1953). Science and Human Behaviour. New York: Free Press. BFskinner.org Google Scholar.

Shinar, D., & McKnight, A.J. (1985). "The effects of enforcement and public information on compliance." In L. Evans & R.C. Schwing (Eds.), Human Behavior and Traffic Safety (pp. 385-414). New York: Plenum Press.

Thew, R. (2006). "Royal Safety for the Prevention of Accidents Conference Proceedings." Driving Standards Agency.

http://www.rospa.com/roadsafety/conferences/congress2006/proceedings/day2/thew.pdf

United Nations Economic Commission for Europe, (2010). Consolidated Resolution on Road Traffic. New York and Geneva, United Nations.

http://www.who.int/roadsafety/projects/manuals/seatbelt/en/index.html.

United States Department of Health and Human Services, (1996). Understanding and Promoting Physical Activity. In Physical Activity and Health: A Report of the Surgeon General. Atlanta, GA: United States Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion. United States Department of Health and Human Services.

Wegman, F and Aarts, L. (Eds.). (2006). *Advancing sustainable safety*. SWOV Institute for Road Safety Research, Leidschendam. http://www.sustainablesafety.nl/

Wilde, G.J.S. (1988). "Incentives for safe driving and insurance management." In C. A. Osborne (Ed.). Report of injury into motor vehicle accident compensation in Ontario, Volume II. Toronto, Ontario: Ontario Ministry of Attorney General and Ontario Ministry of Financial Institutions.

Wilde, G.J.S. (1991). "Effects of mass media communications upon health and safety habits of individuals: An overview of issues and evidence." Addiction (1993) 88, 983-996.

World Health Organization, (2004). *World report on traffic injury prevention*. Geneva: World Health Organization.

World Health Organization, (2009). *Violence and Injury Prevention and Disability*: The "Global Status Report on Road Safety. World Health Organization.

http://www.who.int/violence-injury-prevention/rad-safety

The World Medical Association, (2006). Statement on Traffic Injury. Adopted by the 42nd World Medical Assembly (WMA), Rancho Mirage, CA., USA (1990) and revised by the 57th WMA General Assembly, Pilanesberg, South Africa.

Yennis, G., Louca, G., Vardaki, S., & Kanellaidis, G. (2004). *Development of traffic enforcement programmes for the improvement of road safety*. In the Proceedings of the 2nd International Conference on Transport Research in Greece. Hellenic Institute of Transportation Engineers, Hellenic Institute of Transport, Athens.

Zaal, D. (1994). *Traffic Law Enforcement.* A review of the literature. Report no. 53, Monash University, Accident Research Centre, Clayton, Victoria.

APPENDIX I

UNIVERSITY OF GHANA

INSTITUTE OF CONTINUING AND DISTANCE EDUCATION

INTERVIEW SCHEDULE FOR COMMERCIAL DRIVERS IN HO MUNICIPALITY ON:

ASSESSING APPROACHES TO CHANGING ROAD SAFETY BEHAVIOURS OF COMMERCIAL DRIVERS IN HO MUNICIPALITY OF THE VOLTA REGION.

INTRODUCTION:

This is a study being conducted to find out the effectiveness of the approaches used in an effort to change the road safety behaviour of commercial drivers in Ho Municipality. I therefore appeal to you to answer the following questions as candidly as possible. I wish to assure you that any information given will be treated as confidential.

Thank you in advance for your cooperation.

Instructions

1. Where alternatives have been provided, ring the code number only.
2. For other questions write your answer in the space provided.

SECTION A

DEMOGRAPHIC DATA

1) Age of respondent

   [i] Below 15 [ii] 15-24 [iii] 25-34 [iv] 35-44 [v] 45-54 [vi] 55-64 [vii] 65 and above

2) What is the highest level of literacy you attained?

   [i] Never

   [ii] Basic: Primary / Middle /JHS School

   [iii] Secondary: Secondary form 5/SHS/Commercial/Vocational school

   [iv] Tertiary: Polytechnic/University

SECTION B

DRIVING HISTORY

3) How did you become a driver?.....
   .....
   How many years have you been driving?.....
4) How many years have you been driving as a commercial driver?.....
5) How did you obtain your driving license?.....
   .....
6) What procedure do you go through in renewing your driving license?.....
   .....
7) What procedure do you go through in upgrading your license as a commercial driver?.....
   .....
8) What procedure do you go through in renewing your vehicle's road worthy certificate?.....
   .....

SECTION C

HOW THE COMMERCIAL DRIVERS ASSESSED THE APPROACHES TO CHANGING DRIVER BEHAVIOUR

9) What rules and regulations do we have to ensure safety on the roads?.....
   .....
10) How effective was the Police MTTU in enforcing road safety rules and regulations?.....
    .....
11) How effective was the DVLA in regulating and enforcing road safety rules and regulations?...
    .....
12) What incentives and rewards do you have that encourage commercial drivers to drive safely?.....
13) How did the incentives and rewards affected your driving behaviour?.....
    .....

14) Have you undergone any driver education or training since you started driving?

[ ] Yes [ ] No

15) If no, why?.....

……

16) If yes, what type(s) of education or training was provided?.....

……

17) Who provided the education or training?.....

……..

18) How often do you attend such education or training?.....

……

19) What skills or behaviours do such education or training target?.....

……

20) How did the education or training affected your driving behaviour?.....

……

SECTION D CHALLENGES FACED AS A COMMERCIAL DRIVER

21) What challenges do you encounter as a commercial driver?

……

APPENDIX II

UNIVERSITY OF GHANA

INSTITUTE OF CONTINUING AND DISTANCE EDUCATION

IN-DEPTH INTERVIEW GUIDE FOR THE VOLTA REGIONAL STAFF OF NRSC, DVLA, AND MTTU, ON:

ASSESSING APPROACHES TO CHANGING ROAD SAFETY BEHAVIOURS OF COMMERCIAL DRIVERS IN HO MUNICIPALITY OF THE VOLTA REGION.

INTRODUCTION:

This is a study being conducted to find out the effectiveness of the approaches used in an effort to change the road safety behaviour of commercial drivers in Ho Municipality. I therefore appeal to you to answer the following questions as candidly as possible. I wish to assure you that any information given will be treated as confidential.

Thank you in advance for your cooperation.

MTTU

1 What is the aim of the Police MTTU toward road safety?

2 How do you ensure road safety?

   a. What are some of the road safety regulations you enforce for commercial drivers?

   b. What skills or behaviors were targeted by the enforcement programmes for commercial drivers?

   c. Where do you carry out the enforcement of road safety regulations for commercial drivers?

   d. What approaches were used in enforcing road safety regulations for commercial drivers?

e. How often do you carry out enforcement of road safety regulations for commercial drivers?

f. How do you coordinate enforcement with reinforcement and education?

3 What were the challenges faced in enforcing road safety regulation for commercial drivers?

DVLA

1 What is the aim of the DVLA toward road safety?

2 How do you ensure road safety?

- What are your responsibilities?
- How do you license drivers of commercial vehicles?
- How do you register commercial vehicles?
- What are the requirements for renewal and upgrading of driving license?
- How do you examine commercial vehicles before issuing them with road worthy certificates?
- When do you examine the condition of commercial vehicles on the roads?
- How do you coordinate your activities with legislation, enforcement, reinforcement and education?

3 What were the challenges face in licensing commercial drivers and registering commercial vehicles?

NRSC

1. What is the educational objective of the NRSC on road safety?

2 How do you ensure road safety?

- What were the contents of the educational programmes for commercial drivers?

- Where did you carry out the educational programmes for commercial drivers?
- How often did you organize educational programmes for commercial drivers?
- How were the educational programmes for commercial drivers delivered?
- What skills or behaviors were targeted by the educational programmes for commercial drivers?
- What were the effects of the educational programmes on the commercial drivers?
- How do you coordinate your activities with the other approaches such as legislation, enforcement and reinforcement?

3 What were the challenges faced in ensuring road safety?