

TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN IN THE ETHEKWINI MUNICIPALITY

by

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ABSTRACT

The annual incidence of pedestrian casualties on South African roads is approximately 34 000. This includes 4 000 deaths, 10 000 serious injuries and 20 000 minor injuries, costing the country an estimated R2,55 billion. A large number of injuries involve children and this is distressing but preventing this is a challenge.

Statistics indicate that pedestrians are most at risk. School children have been identified as forming a considerable percentage of pedestrians. Consequently it is important to understand factors that influence children's travel patterns as an initial step toward reducing the accident rate. This study examines children's travel patterns at primary and secondary schools in the eThekweni area.

In the absence of statistics regarding journeys to transport children to school, a questionnaire survey was designed to determine demographics, mode of travel to school, travel cost and duration, factors influencing choices of alternate modes of travel and problems experienced during school travel in terms of road safety. In addition, an on-site investigation was undertaken to assess the relevant engineering aspects including geometric design, traffic calming, signage and other traffic management aspects.

This study focuses on scholar transport and discusses the findings of pilot and focal surveys.

On analyzing the data, various problems were identified, namely: the road environment favours drivers over pedestrians, an absence of a formal travel plan, poor driver behaviour and an absence of dedicated school buses. A range of possible solutions is recommended. The recommendations focus on the Engineering, Enforcement and Evaluation aspects.

DECLARATION

This dissertation, except where indicated in the text, is the candidate's own work and has not been submitted in part, or in whole, at any other University or University of Technology.

This research was conducted at the Durban University of Technology under the supervision of Dr Dhiren Allopi.

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- Appendix C - Site Assessment Checklist
- Appendix D - Conference presentations based on this study

ABBREVIATIONS

AARTO	Administrative Adjudication of Road Traffic Offences
CORSAF	Community Road Safety Forum
DOE	Department of Education
DOT	Department of Transport
ETA	eThekweni Transport Authority
GRSP	Global Road Safety Partnership
INK	Inanda, Ntuzuma and Kwa Mashu
LDV	Light Delivery Vehicle
mvk	million vehicle per kilometre
NGOs	Non Governmental Organisations
RAF	Road Accident Fund
RTMC	Road Traffic Management Corporation
SAPS	South African Police Services
UK	United Kingdom
UN	United Nations
WHO	World Health Organisation

CHAPTER 1 : INTRODUCTION

1.1 Background

Transport is no longer recognized as largely a matter of laying out roads and constructing bridges but is now considered a matter also relevant to public health, children's social development, social inclusion, urban vibrancy and environmental sustainability.

The rapidly increasing level of car ownership and usage in South Africa is resulting in progressively more traffic congestion throughout the country. However, very few organisations are examining ways of reducing traffic density as part of the broader transport policy.

There are currently very few studies – and limited statistics – on travel patterns of scholars in South Africa.

This dissertation enumerates several important issues in children's travel as identified by a review of existing research findings both locally and internationally, and supplements this with an analysis of children's present-day travel patterns in the eThekweni area.

The most important issues underlying the increased use of private cars relate to concerns over traffic safety and personal safety.

Children do not have the same ability as adults to deal with traffic. Drivers do not slow down for children and in many instances children are forced to walk across busy streets that do not have adequate provisions for safety. Children by nature have a shorter attention span and will grow impatient when waiting to cross the street. Children should be free to be able to walk without compromising their safety.

1.2 Importance Of Scholar Travel

School travel is important for a number of reasons. School journeys usually take place at peak times and have the same destination every day. Regular journey patterns are often easier to target with road safety programmes or travel demand management strategies since large numbers of people travelling to the same place at the same time increase not only the efficiency with which safety programmes can be delivered but also the potential for shared services (Morris, Wang and Lilja, 2002). There is also a strong link between the school journey and the journey to work since many parents drive their children to school on their way to work and the need to escort a child may be a barrier to the adult leaving the car at home. Thus authorities adopting policies aimed at discouraging adults from driving to work may need to encourage school travel plans as well so that there is an incentive for the parent to leave the car behind.

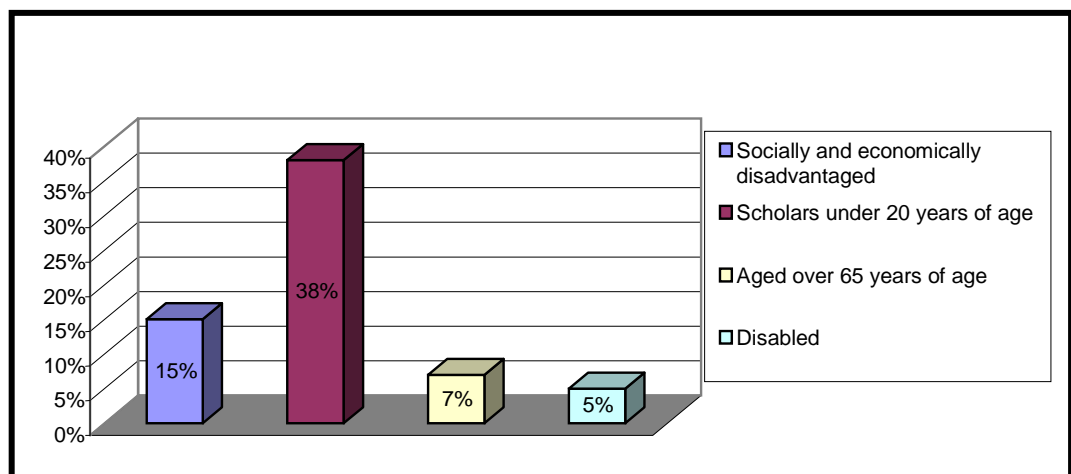


Figure 1.1: Population census for Special User Groups in the eThekweni Area

The 1996 Population census was the main source of data used to quantify the special user groups in the eThekweni area. Special need groups, as delineated into four categories for the purposes of this study, accounted for 65% of the total population. Figure 1.1 illustrates that scholars make up the largest proportion of such users (38%) (Traffic and Transport Department, 1995).

Surveys carried out by the eThekweni Transport Authority (ETA) as part of the Fundamental Restructuring Project indicate that scholars account for some 20% of peak hour commuters (eThekweni Transport Authority, 2002).

Unfortunately, in many spheres “road safety” has become synonymous with education of children, and the perception of success or failure of past efforts depends entirely on presentation of statistical information. However, McGregor, Smiley and Dunk (1999) propose that the role of education is limited because children's accidents arise not due to lack of knowledge, but due to children making “mistakes”. Their argument is that the answer to the problem cannot be better education alone, but lies in working towards a more favourable traffic environment.

1.3 Objectives

The objectives of this research were:-

- To determine by means of a questionnaire survey the perceptions of learners and parents regarding the transportation of scholars. This includes determination of the current and ideal travel patterns of scholars at primary and secondary schools;
- To review the relevant literature nationally and internationally;
- To assess the engineering aspects pertaining to road safety in the vicinity of schools by way of a checklist;
- The development of a suitable framework upon which an appropriate model can be developed which would result in the desired safety of school children.

1.4 Overview Of Chapters

The dissertation is structured as follows:-

- Chapter 1 deals with a general discussion of scholar transport;
- Chapter 2 deals with the literature review and forms the basis from which the dissertation is developed;
- Chapter 3 discusses the outcomes of the pilot survey;
- Chapter 4 explains the outcomes of the focal survey;

- Chapter 5 elicits conclusions from this study, lists the recommendations and provides some feedback for further studies.

1.5 Limitations

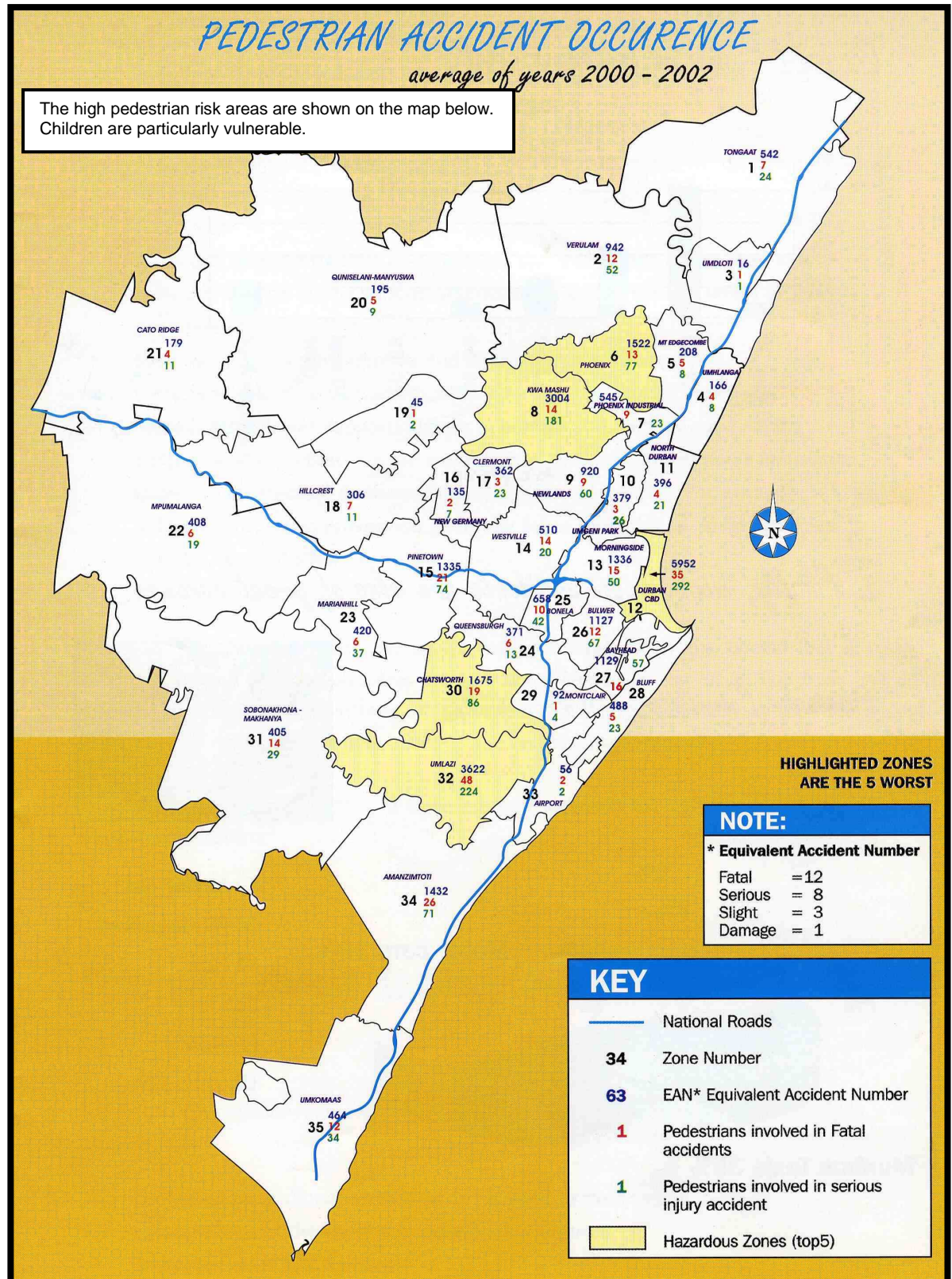


Figure 1.2: Study Areas
Source ETA, 2005

Figure 1.2 shows the study areas and area specific pedestrian accident statistics. This material was obtained from the ETA Road Safety Plan 2005-2010 (2005).

The study areas were chosen by the author on the following basis:-

- Areas showing a high incidence of fatalities;
- Informal discussions with personnel from the eThekweni Municipality;
- The willingness of schools to co-operate.

This study is limited to the following areas of the eThekweni municipality:

- Umlazi;
- Chatsworth / Shallcross;
- Umgeni South – Durban;
- Phoenix;
- KwaMashu / Inanda;
- Ntuzuma;
- Chesterville.

1.6 Methodology

The methodology for this study was as follows:-

- A literature review was conducted of pertinent material related to scholar travel internationally, nationally and locally;
- Primary data pertaining to accident statistics was obtained to identify “red spot” areas or locations;
- In the absence of statistical data a questionnaire survey was carried out to determine demographics, mode of travel, travel cost and duration, factors influencing alternate mode of travel and problems experienced during school travel. This questionnaire was targeted at primary and secondary school children and/or parents depending on the grade of the child. The survey was divided into five sections.
- A pilot survey was conducted to test and improve the questionnaire survey;

- A focal survey was conducted which incorporated other schools also in areas of high incidence of accidents;
- On-site observation (using a checklist) for the assessment of engineering aspects including geometric design, traffic calming, signage etc.;
- Analysis of the data and subsequent discussion, conclusions and recommendations.

CHAPTER 2 : LITERATURE REVIEW

2.1 Background

Accidents in the eThekwin Municipality during 2003 cost on average an estimated R6 million per day inclusive of hidden costs such as trauma, grief, suffering and inconvenience (eThekwin Transport Authority, 2003). The importance of road safety and continual research into road safety cannot be overemphasized. During 1996, a total of 605 children in the age group 0-18 years were killed and 5 509 were injured non-fatally in traffic collisions involving pedestrians in South Africa (Venter, 2000). Pedestrians in accidents stand a 93% chance of sustaining injuries, while drivers in accidents stand a 5% chance (eThekwin Transport Authority, 2002).

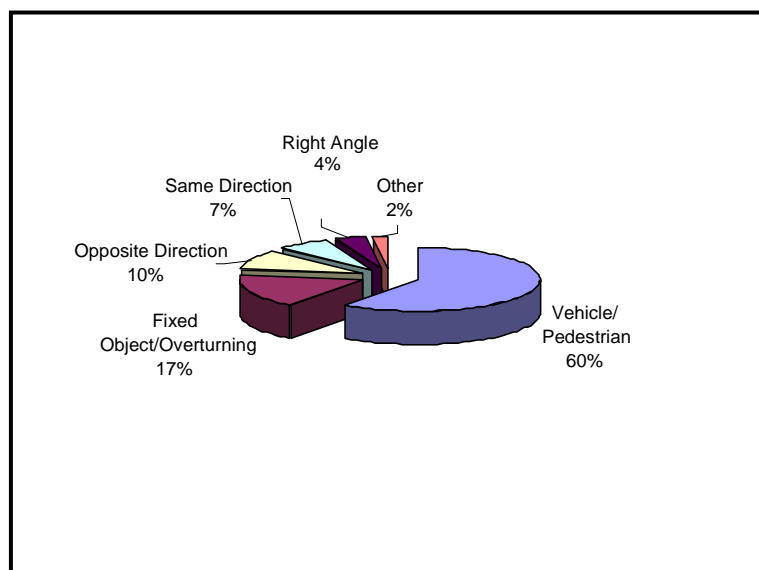


Figure 2.1: Death by Accident Type

Source: eThekwin Transport Authority 2002

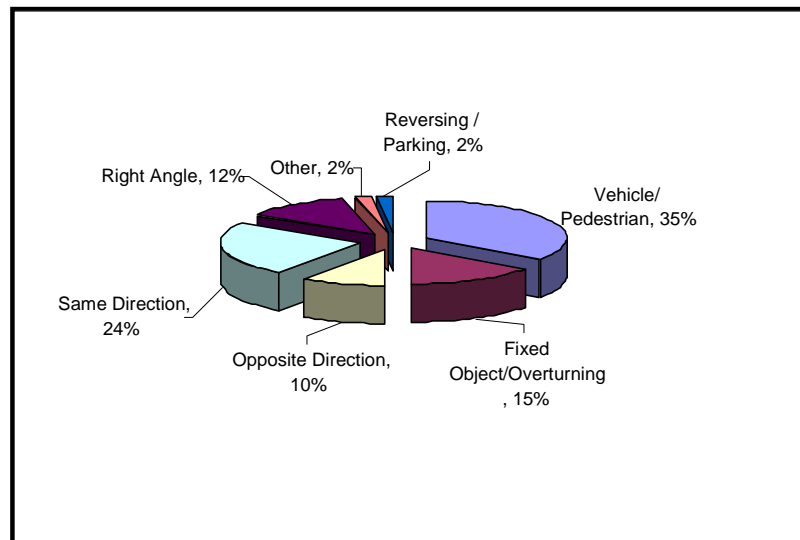


Figure 2.2: Casualties by Accident Type

Source: eThekwin Transport Authority 2002

Figure 2.1 illustrates that pedestrian deaths make up 60% of deaths by accident type, while Figure 2.2 reflects the fact that pedestrian casualties constitute 35% by accident type in the eThekwin Municipality. The proportion of pedestrian casualties in Gauteng, Western Cape, Eastern Cape and KwaZulu-Natal is above the national average. According to the "Arrive Alive" campaign of the Department Of Transport, 25% of pedestrian fatalities are children aged 16 years or younger

(<http://www.arrivealive.co.za/pages.asp?mc=Educational&nc=EdRoadSafety>).

It is thus important to understand factors that influence children's travel patterns as an initial step toward reducing the accident rate.

2.2 Road Safety

2.2.1 Road Safety on an International Level

The statistics below are sourced from the Global Road Safety Partnership, a hosted programme of the International Federation of Red Cross and Red Crescent Societies, based in Geneva. (<http://www.grsroadsafety.org>).

An estimated 30 million people have been killed in road accidents since the invention of the motor vehicle over a century ago. The World Health Organization (WHO) has forecast that road accidents will be the third most important cause of death and disability worldwide by 2020. With more than 1,2 million people killed in road accidents every year, urgent action is needed.

Vulnerable road users are particularly at risk, especially children. 500 children die every day in road accidents. In many Asian, African and Middle Eastern countries between 40 and 50% of people killed as a result of a road accident are pedestrians.

More children died in Africa in 1998, according to WHO, from road accidents than from the HIV/AIDS virus.

The percentage of children under 15 years old killed in road accidents in developing countries is currently almost three times higher than that in highly motorised industrialised countries.

Road accidents affect predominately the young and middle aged with approximately 67% of all deaths sustained by persons under 45 years of age, while accidents to retired and elderly people account for 10%.

Road accidents are the second biggest killer of young men – only HIV/AIDS claims more lives.

Globally, more than 40% of all road traffic deaths occur among people aged 25 years or younger. As children and young people constitute a major group at risk of death, injury and disability on the roads, the United Nations Global Road Safety Week was dedicated to “Young Road Users” who travel the roads as pedestrians, cyclists, motorcyclists, novice drivers and passengers.

Hundreds of initiatives to improve road safety take place around the world, organised by governments, nongovernmental organisations, the United Nations, other international agencies, private sector companies, and others working for safer roads. These events include high-level policy discussions on road safety, launches of new road safety strategies or plans of action, the adoption of new legislation related to road safety, ceremonies dedicated to victims of road traffic injuries, or a host of high-profile advocacy events, including some involving national and local media.

Developing and transitional countries own 40% of the world's motor vehicles, but account for 85% of its reported road fatalities. Africa and the Middle

East/North Africa region alone own only 3% of the world's vehicles, but fatalities are almost three times the international average of road deaths.

Figure 2.3 below shows a map highlighting the road traffic injury mortality rate (per 100 000 population) in WHO regions for 2002. It clearly confirms that the mortality rate for Africa is high.

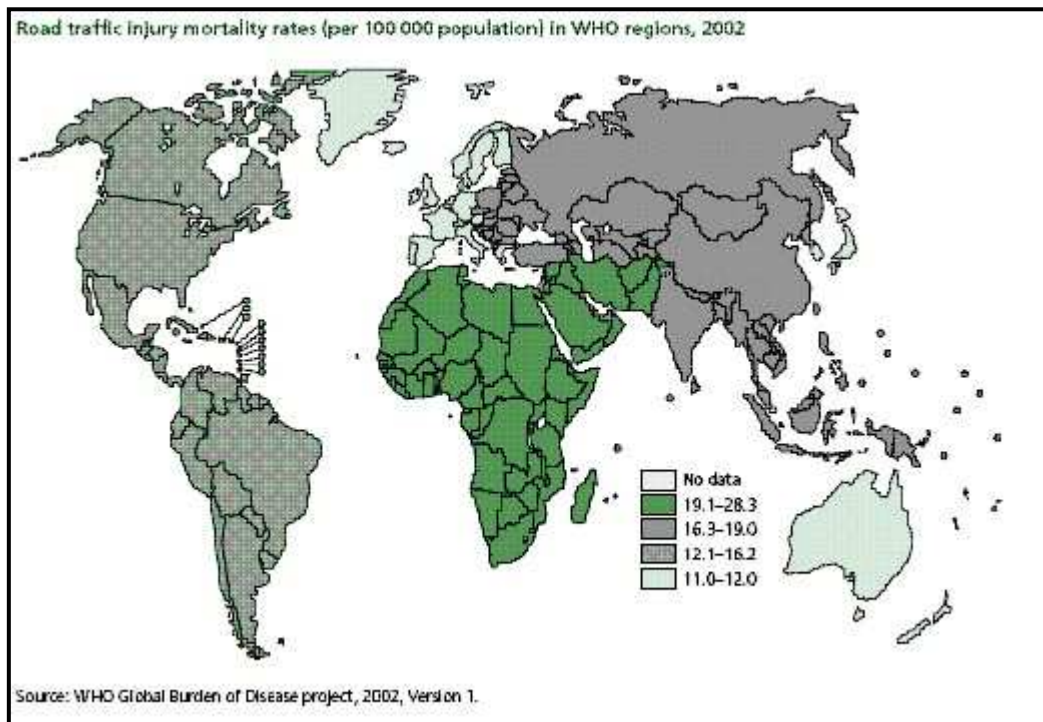


Figure 2.3: Road Accident Mortality Rates (per 100 000 population)

Source: Global Road Safety Partnership website - <http://www.grsroadsafety.org>

Research has shown that the total number of people killed in road accidents in the developing world continues to increase, whereas in highly motorised countries there has been a steady decrease over the last 15 years. For example between 1987 to 1995, road deaths rose by the following amounts: Asia-Pacific 40%; Africa 26% (excluding South Africa, where deaths began to decline); Middle East/North Africa 36% (Saudi Arabia alone rose by 58%). During the same period, road deaths fell by about 10% on average, in highly motorised countries.

Many developing and transitional countries are experiencing a rapid increase in the number of cars on the road. In response, they are undertaking major highway rehabilitation and modernisation programmes. Too often, opportunities to integrate road safety at an early stage in these projects are

being missed. In addition, lessons learned by industrialised countries are not being shared with developing and transitional countries.

2.2.2 Road Safety on a National Level

Roads in South Africa provide a mixture of first and third world traffic conditions, creating variations in the population's awareness of road safety hazards and its capacity to cope with the different traffic conditions.

Road conditions vary from well designed and developed dual-carriage motorways that run between the major cities and tourist attractions to non-paved and poorly maintained rural roads.

A major road safety concern is that many pedestrians use or cross the expressways. The presence of animals also creates safety hazards on rural roads. In addition, much of the local social life of the population occurs on and around the road network in the rural areas.

2.2.2.1 Vehicle fleet

According to the Department of Transport website, there are approximately 6 million licensed drivers and 7.5 million registered vehicles in South Africa. In 2004, motorised vehicles made up 89.3% of the total vehicle population. The main means of passenger transport is bus or "taxi". In urban and sub-urban areas there is a dense population of "taxis" which in fact are light vans fitted with all kinds of seating arrangements. Drivers' experience, overloading, and lack of vehicle roadworthiness are major road safety concerns.

<http://www.transport.gov.za/projects/rts/setting.html>

2.2.2.2 Road Safety Situation

Traffic safety is regarded as a serious problem by the South African government. The number of fatal road traffic accidents decreased from 9 174 in 1990 to 7 260 in 1998. However, beginning in 1998, the situation has continued to worsen and in 2004 there were 10 530 fatal accidents. The number of fatalities increased from 9 068 in 1998 to 12 727 in 2004. The number of fatal accidents per 100 million vehicle kilometres (mvk) travelled increased from a low of 6.20 in 1998 to 8.79 in 2002. From 2002 a steady annual decrease in this rate was recorded to a rate of 8.63 in 2004. The number of fatalities per 100 mvk increased from 7.75 in 1998 to a rate of 10.75 in 2002. From 2002 a slight annual decrease was experienced to a rate of 10.44 in 2004. The number of fatalities per 100 000 population shows a steady annual increase from 21 610 in 1998 to 27 320 in 2004. Pedestrians account for 38% of road crash fatalities.

(<http://www.grsproadsafety.org>)

2.2.2.3 Road Safety Co-ordination

The national “Arrive Alive” programme was initiated by the Department of Transport in October 1997. It aims to decrease the fatalities on South Africa's roads by 5% annually and supports the Department of Transport's mission: “To ensure an acceptable level of quality in road traffic, with emphasis on road safety, on the South African urban and rural road network”.

Arrive Alive co-ordinates and harmonises traffic law enforcement on local levels. Mass communication initiatives support law enforcement efforts. Funding by the Road Accident Fund (RAF) should ensure the sustainability of the Arrive Alive initiative. It is a year-round, 7 days a week campaign, but lacks resources due to financial difficulties related to the RAF.

Additionally, the government launched the “Road to Safety Strategy 2001 - 2005” in order to target issues such as institutional reforms, the upgrading of the road infrastructure, driver and vehicle fitness and the reformation of regulatory and monitoring institutions. The strategy consists of a set of carefully measured, balanced and prioritised actions that are practical,

affordable and implementable. Development of the Strategy was a collaborative effort that included input from National, Provincial and Metropolitan Departments of Transport and other diverse stakeholders.

In 2006 the Minister of Transport, Minister Radebe, launched the **Department of Transport Strategic Plan 2006 - 2009**. The Strategic Plan was more than a mere road safety plan, and focused on service delivery through the implementation of the principles of Batho Pele across all spheres of Transport. The following areas of delivery were identified:-

- Public transport infrastructure and operations for 2006 and beyond;
- Public Transport;
- Freight;
- Roads;
- Transport Regulation.

<http://www.transport.gov.za/library/docs/index-policy.html>

With increased concern about the carnage on our roads it is clear that government has resolved to initiate interventions that make road safety meaningful.

Companies also have their own Road Safety Initiatives. One example is the Community Road Safety Forum (CORSAF). This is a community-based initiative in partnership with the Gauteng Department of Transport. Seven independently run sub-road-safety forums exist, each dealing with particular road safety issues. Issues and projects include pedestrian safety for school children, establishment of junior traffic centres at schools, taxi-driver education, pedestrian safety issues and support of Arrive Alive projects.

Another initiative involving the Peninsula Technikon in Cape Town is the development of materials to supplement driver training and general awareness of good driving practice. Students gain valuable social and economic skills. About 4 000 students have participated in this programme over a 12-month period.

An innovative road safety campaign involves Soul Buddyz, an educational TV series dealing with health and safety issues. Soul Buddyz 1, the children's

series aimed at 8-12 year olds, deals with issues of road safety by means of television, radio and print materials. The material raises awareness of road safety and the importance of reflector material such as luminous headbands to increase child visibility

(<http://www.soulcity.org.za/programmes/advocacy/campaigns/road-safety>).

2.2.2.4 Road Safety Initiatives

Road safety initiatives in the future will include those at National, Provincial and Local Government level. Government has made monies available to improve South Africa's public transport systems. The Minister of Transport has indicated that the following are necessary to achieve the goal of Road Safety:-

- The reinforcement of the Road to Safety Strategy imperatives;
- The implementation of the Administrative Adjudication of Road Traffic Offences (AARTO) Act, and its system of demerit points, improved fine collection, parity of fines and easier fine payments;
- A completed tender for a feasibility study into periodic vehicle testing;
- Discussions with organised labour and industry regarding improved driving hours;
- Improved enforcement through the co-ordination bodies of the Road Traffic Management Co-operation, and an increased number of officers being trained and deployed throughout the country;
- The Taxi Recapitalization Programme – taking out the oldest and most unroadworthy of the fleet, and replacing them with new vehicles with set safety standards.

The Department of Education is in the process of developing an extensive Provincial Learner Transport Strategy. The following table has been extracted from the Guidelines for Learner Transport Assistance Plan (Department of Education, 2006):

Table 2.1: Guidelines for Learner Transport Assistance Plan

Mode of Travel	Time (Primary School)	Time (secondary schools)	Distance	Keynote
Walking	<30 mins one way	< 45 mins one way	2 - 4km	➤ Safety and security not be threatened.
Bicycle	n/a	45-70 mins one way	3.5 - 6 km	➤ Safety and security not be threatened. ➤ Flat topography. ➤ Bicycles provided to schools.
Bakkies	>30 mins one way	>45 mins one way	n/a	➤ Where road infrastructure is unsuitable for other forms of transport. ➤ Vehicles comply with National Road Safety Act, 1996.
Mini bus taxis	>30 mins one way	>45 mins one way	n/a	➤ Road infrastructure is adequate. ➤ 9-18 learners need to be transported along one route.
Midi buses	>30 mins one way	>45 mins one way	n/a	➤ Road infrastructure is adequate. ➤ 20-35 learners need to be transported along one route.
Standard buses	>30 mins one way	>45 mins one way	n/a	➤ Road infrastructure is adequate. ➤ 45-65 learners need to be transported along one route.
Assumed that all vehicles meet the vehicle safety requirements. On implementation of the taxi recapitalisation projects, only recapitalised taxis are acceptable.				

2.2.3 Road Safety on a Municipal Level

Several provinces have already planned extensively towards addressing “Road Safety and the 2010 World Cup”.

The strategies below are being promoted by the Arrive Alive campaign:-

- improving tourist safety;
- planning and co-ordinated implementation of road safety programmes by all agencies in the provinces on Provincial, Metropolitan, District and Local Authority levels;
- clamping down on unroadworthy public and private vehicles, unfit drivers, speeding in excess of speed limits, drivers and pedestrians under the influence of alcohol or drugs, offenders

disobeying the rules of the road and those with a disregard for the payment of traffic fines;

- significant increases in visible policing, road blocks and road side check points;
- an increased focus on traffic education, combining government's traffic education programmes with private sector initiatives to enhance safe schools, junior and adult pedestrian education and driver education;
- increased overload control to protect road infrastructure;
- addressing the capacity of traffic law enforcement to enforce the law, to restore road discipline and change the behaviour of road users to acceptable levels;
- acquisition and application of intelligent traffic management technology and equipment to enhance the effectiveness and productivity of traffic management;
- improved accident information and traffic management systems;
- evaluation of traffic management programmes and operations to ensure continuous improvement and sharing of learning amongst all traffic agencies;
- supporting the National Minister of Transport's programmes to improve road safety through sustainable and effective co-operation among all spheres of government and in partnership with the private sector.

http://www.arrivealive.co.za/pages.asp?mc=history&nc=2010_worldcup_safety

In Kwa Zulu Natal, a pilot Safer Communities initiative has been set up at Umlazi in order to combat the high accident rates there. The partners of this project are BP Southern Africa, CSIR, Department Of Transport KZN, Department of Education, Mangosuthu Technikon, University of KwaZulu Natal Interdisciplinary Accident Research Centre (UKZNIARC), Umlazi Councilors and the Umlazi community.

The outcomes of this project include training of community members via workshops, training of educators, and competitions for learners.

2.2.3.1 ETA Initiative 2005-2007

A comprehensive Road Safety Plan was developed in 2004 and implemented in 2005.

The initial phases targeted the Durban CBD, Umlazi, Chatsworth, Phoenix and the INK region (Inanda, Ntuzuma and Kwa Mashu).

Table 2.2: Summarised ETA Initiatives 2005-2007

Phase One August 2005	Adult Pedestrian Awareness Campaign in the Warwick Junction.
School Awareness Campaign October 2005	This involved 12 schools and 10 000 learners. Road Safety Awareness campaigns. Competitions regarding artwork and essay writing. Walk to School Week.
2006	School Road Safety Campaign. Road Safety Drama "Qaphela" presented to schools in INK regions. Fun-filled entertainment that includes the correct procedure to follow when crossing the road and when boarding buses and trains. Traffic Calming at school started and ongoing as funds became available.
2007	School Road Safety Campaign extended to include all primary schools where Zulu is the first language. 210 000 learners at 355 schools in the INK, Umlazi and rural eThekweni schools.

Table 2.2 above shows a summarised version of ETA initiatives.

2.2.3.2 Current Initiatives from the ETA

The ETA has launched the "Road Safety Schools Awareness Campaign for Primary Schools".

The ETA intends promoting the Intensive Primary School Programme and plans to achieve a 10% reduction in the incidence and severity of pedestrian accidents by 2010 in the areas as outlined in the 2005 Road Safety Plan.

In summary this programme will be aimed at 14 primary schools in the Umlazi, Ntuzuma, Austerville, Sydenham, Verulam, St Wendolins, Tshelinyama, Dassenhoek, Kwadabeka, Newlands West, Besters and Chatsworth regions.

The programme will include dramas, DOT Edutainment, DVD/Videos, Child in Traffic, Art Competitions, Metro Police Blitzes and SAPS Road Safety Talks.

The following departments are responsible:-

- ETA Road Safety Branch;
- Metro Police;
- Engineering;
- Education;
- Communication;
- DOT.

This campaign was implemented in the 3rd and 4th terms of 2008.

2.3 Modes of Travel

2.3.1 *Walking*

Safety is not only a problem for public transport passengers but also for pedestrians walking along public roads. South Africa has a disturbingly high pedestrian accident record. Many of these pedestrians are public transport users walking to or from bus and taxi stops. It is common knowledge that pedestrians are regarded as a particularly vulnerable group – not only because of the serious nature of the injuries pedestrians are likely to sustain in an accident, but also because of their socio-economic status and therefore their lack of access to sophisticated health care.

In South Africa about 2 million primary school children between the ages of 6 and 13 years have to cross busy streets at schools or nearby. Not enough traffic officers are available to provide point duty to assist these children to cross roads (Ribbens, 1996).

It is widely acknowledged that one of the greatest disincentives to walking, and especially to cycling, is fear of accident involvement. Everyone benefits from walking but walking needs to be safe and easy.

Pedestrian accidents among children is an important transportation issue. Several policy initiatives have focused on reducing childhood accidents in South Africa, yet those efforts exist within a context of limited and insufficient data. Speed is an important determinant of injury severity along with poor visibility.

Desk studies have found that the risk of child pedestrian accidents is higher in streets with high traffic volumes compared to streets with low traffic volumes. Furthermore the risk is higher in streets with high travel speeds compared to streets with low travel speeds (Victoria Transport Policy Institute, 2008).

There are recognized positive benefits to be gained by both scholars and parents as a result of walking to school. Health benefits include reduced risk of heart disease and stroke and enhanced mental health and quality of life.

From desk studies, it appears that increased traffic flows and high travel speeds deter parents from allowing their children to walk to school. Therefore, there is a case for installing traffic calming measures around all schools to increase pedestrian safety. In addition safe routes for walking need to be established. Parents should be able to feel that their children are safe using these routes and to realise that using non-motorised modes may be safer than the use of the car (Scottish Executive Central Research Unit, 2002).

There is potential to communicate positive messages about the benefits of walking. The exercise from this activity leads to a healthier lifestyle, social development of children, environmental benefits such as cleaner air (which has an effect on everybody's health), and reduced transport costs.

2.3.2 Cycling

Present road traffic conditions, infrastructure and terrain in the eThekweni area make it unsafe to ride a bicycle. Cycling benefits both the environment and the riders. Cycling saves time and money. The level of cycling in the Durban area is low. The bicycle is one of the most cost efficient modes of transport. Bicycle sales worldwide are three times as high as that of motor vehicles. This research will not be a comprehensive study for the potential of bicycle transport, but will investigate the potential of bicycle transport to be integrated into the school travel plan.

Cycling is also considered to be an effective method of increasing children's sense of independence and building road sense.

Positive encouragement of cycling could include dedicated cycle lanes or tracks, facilities at school to store bicycles, and shower facilities at schools. Campaigns such as "cycle to school" encourage cycling but need sustainability and should incorporate protective gear.

Of all the alternative travel modes considered, cycling has the least potential as a replacement for car travel. Although parents do not object in principle to the idea of children cycling to school, the reality is somewhat different. For many parents the resistance to cycling is entrenched and the mode is seen as highly dangerous given the congestion around schools. Even children themselves do not feel confident about using this method of travelling, despite the fact that they generally have more confidence in their own ability than adults (Scottish Executive Central Research Unit, 2002).

It would take substantial infrastructure changes and significant alterations in the attitude of drivers before any move towards cycling for school travel could be considered.

2.3.3 Cars

Car ownership is closely linked to household income and impacts significantly on the requirements for public transport. In the greater Durban area the rate of car ownership is approximately 190 cars per 1 000 people, with high-income areas at 400 cars per 1 000 people, low-income areas 100 cars per 1 000 population and rural areas 20 cars per 1 000 people. Low-income areas rely heavily on public transport whereas high-income areas generally make use of private vehicles even though a reasonable public transport service may be available. It is important to reduce the dependency on private transport as this will reduce traffic congestion and the need for investment in capital-intensive road structure (Traffic and Transport Department, 1995).

Reasons for increased car usage for school transport include:-

- Perception of safety (or lack of safety) and actual risk to pedestrians and cyclists in terms of personal safety and road safety;
- Increasing traffic flows have made walking and cycling more dangerous;
- Linking journey to school with journey to work;
- Increase in car ownership;
- Increased time pressures, particularly when both parents are working;
- Reduced levels of bus services due to reduced bus patronage;
- Lack of awareness of the availability of suitable public transport systems.

The increasing dependency on the car has negative side effects such as:-

- An increase in peak period traffic congestion;
- An increase in atmospheric pollution around schools;
- Fewer opportunities to develop road and personal safety skills;
- Lack of road sense as pedestrians, cyclists or drivers later in life;
- Lack of exercise with resulting impact on general health and wellbeing;
- Reduction in children's independence and social interactions;

- Establishing travel habits early in life that will be difficult to change later.

In summary, desk research shows that the custom of driving children to school is becoming more common. This could be attributed to increasing distances to travel to school (in part influenced by parental choice of schools), increasing number of single parent households and households where both parents work, increasing affluence of the population and increasing car ownership levels (Scottish Executive Central Research Unit, 2002).

Desk studies also suggest that some drivers may feel a need to justify ownership of cars and this will increase, rather than decrease, the extent of car usage (Scottish Executive Central Research Unit, 2002).

Despite the fact that daily use of a car incurs petrol costs and considerable wear and tear this does not seem to deter parents from driving their children to school.

Measures identified in other studies that may help to slow down or reverse the trend of driving children to school include better public transport services such as more buses and greater availability of bus services, more readily available information on bus timings and routes and more routes that run directly past schools. School bus services need to be made more available, perhaps extending access to those children who currently do not qualify for free transport to school or perhaps to allow children access albeit on a reduced fee basis.

Not all parents can be persuaded to reduce use of the car for journeys to and from school. Implementation of these recommendations is not likely, on its own, to bring about a significant reduction in the number of drivers using the roads for the school journey. However, if the right mixture of initiatives is introduced at each school, some parents may be persuaded to stop using their cars for some journeys entirely (perhaps in the afternoons), while others may be persuaded to reduce the distances travelled by car or the frequency of driving (Scottish Executive Central Research Unit, 2002).

Some parents who transport their children to school as part of commuting to work, or who have to deliver children to other schools, would be unlikely to change their routine, and so messages and initiatives will need to focus on those offering greatest opportunities for conversion.

2.3.4 Public Transport

The Kwa-Zulu Natal Department of Transport (DOT) is continually striving to improve public transport mobility of all sectors of the community including the learners. Presently learners are using a public transport system that is deficient in infrastructure, regulation, safety, operations and funding. This reduces the ability of the DOT to fulfill its mandate of ensuring autonomy of mobility and equal access to educational opportunities. Notwithstanding the fact that the DOE is responsible for ensuring that learners are transported, the Department of Transport has to ensure that the public transport system available does indeed cater for the needs of learners.

2.3.4.1 Buses

In recent years fewer people are using buses, probably because of the increase in the use of mini bus taxis. National policies aim to improve existing road networks, relieve congestion and encourage the use of public transport. These policies state, for example, that 80% of commuter trips should be by public transport and that patrons should not have to spend more than 10% of their disposal household income on public transport (Department of Transport, 1996).

In the Durban Metropolitan area 57% of commuter trips are currently by public transport. This varies considerably in different locations, with some areas having public transport usage as high as 94% and others practically none at all (Traffic and Transport Department, 1995).

2.3.4.1.1 School Buses

Research data supports the claim that children across all ages are more likely to use a school bus in rural and semi-urban areas than in urban areas. Within the urban and suburban areas, the parents of primary school children who are currently being driven to school seem to question the need for school bus services for their children as well as being concerned about the logistical problems of using such a service. The advantages of using this mode of travel include an improvement in the social conduct of children and independence in children.

The perception of the school bus being relatively safe stems from a number of factors:-

- An assumption that a driver of a school bus will constantly provide this service on a particular route at a particular time and thus have opportunities to get to know the children they have to collect. The driver will be more likely to be prepared to wait an extra moment or two for a child who arrives late. This can create more confidence amongst parents that their children will be properly looked after;
- Comfort can also be drawn from the mix of other passengers on the school bus who will at least be from a known group of fellow pupils;
- These services will also often deliver children directly to school;
- These services are either without charge or at a nominal fee thereby saving the household from the expense of using a car;
- While environmental issues are relatively unimportant to parents (in comparison to safety issues), most parents and children acknowledge that using a school bus benefits the environment as it reduces the cars on the road;
- The disadvantages include logistical, practical and emotional reasons. Bus routes negate potential use simply because the route does not go close enough to homes. This concern diminishes as a child gets older. For younger children the parents' involvement at the start or the end of the journey tends to enhance the likelihood of using the car.

- In most instances where parents have to walk or drive children to a collection point, most claim that it is easier and more convenient to simply drive the child all the way to school.
- Reliability of service with particular reference to travel times can negate use of a school bus. For children in primary schools, parents are unwilling to leave them waiting for a bus service at a collection point without some form of supervision. Parents of secondary school children are more willing to do so;
- Bad weather also inhibits use of a school bus;
- There is a need to ensure that all vehicles used to provide a school bus service are fully road worthy and contain all necessary safety features.

2.3.4.2 Public Transport Buses

In many instances, the advantages and disadvantages of using a public bus service mirrors those for a school bus service.

Public bus services are slightly less appealing due to concerns about danger, inconvenience and cost.

Bus options appear to hold greater potential for older children because younger children are not considered to be old enough to travel without a parent. If accompanied travelling is required, then other modes of travelling are more likely to appeal to parents.

Service reliability and frequency is also a major concern for parents, because problems here could lead to delays or missing school which could lead to anxiety.

Additionally, public bus drivers are perceived to work on a wide number of different routes and lack opportunities to get to know regular passengers compared with counterparts driving school buses.

Parental concern includes the grouping of scholars with strangers and this prejudices their safety. Parents are more willing to use the bus service if their

children travel with their peers. Public buses could become more attractive with the reintroduction of conductors who could be responsible for monitoring the behaviour of scholars.

It is also assumed that the public buses are less likely to stop near schools compared to school buses.

Public service buses do not offer the same sense of safety as school buses. Although there are assumptions that public buses will meet safety requirements in terms of roadworthiness, a lack of seat belts makes this a less attractive option. Rainy, cold and unpleasant environments make this service less attractive. Cars are cited for the convenience of being able to leave the family home as late as possible and yet still arrive at school on time.

Cost is an issue that impacts upon this mode of travel. Public transport is generally perceived to be more expensive although many parents are unaware of the precise cost involved.

2.3.4.3 School Transportation in Britain

There is no dedicated transport system for the school children of Britain, however the government provides home to school transport for many of them. School transport in Great Britain is the responsibility of the local education authorities (Thorntwaite, 2006).

By law, all local education authorities must provide home to school transport free of charge for: -

- Pupils who are under eight years of age and who live more than 3.2 km from their nearest appropriate school;
- Pupils who are eight years to sixteen years of age who live more than 4.8km from their nearest appropriate school;
- The walking route is considered unsafe for an unaccompanied child;
- Children with special educational needs;
- Children with financial constraints.

The American yellow school bus was introduced in Wales and several areas of England. The numbers were small and spread out. A pilot project in 20 local education agencies throughout Wales and England was undertaken. The programme offers transportation by bus at reduced cost for students who live within walking distance of school but where traffic congestion makes those routes unsafe.

Local education authorities currently spend two percent of the overall education expenditure on transporting children to and from school.

Overall in Britain there are approximately 8 million school age children of whom 20-25% receive free transport from the local education authority. These children are usually transported on contracted vehicles i.e. minibuses, buses, coaches or taxis. In urban areas or where there is public transport available, children are transported on public transport. In a few circumstances parents are paid to transport children. A few authorities, particularly in London, have their own fleet of vehicles to transport pupils. Currently London is the only authority to provide a dedicated school transport service. However, several transport authorities have begun purchasing vehicles for dedicated school transport service, to ensure there is competition with the private operators.

Arriva, Go Ahead, Stagecoach, and First Bus have become the dominant private bus operators. National Express, which recently entered the U.S. market, runs mainly long distance intercity services in Great Britain, whereas the FirstGroup and Stagecoach, which also entered the U.S. market, are both involved in school transport in Great Britain.

There are close links between public transport and school transport. Private operators control local bus networks, including school transport. Public authorities are buying dedicated buses to compete with these dominant private operators.

All buses and coaches in Britain have to meet public service vehicle standards which set the standards for vehicle construction, use, licensing and driver training requirements.

In recent years the seat belt debate has become a high profile issue in Britain following a series of accidents involving children. As a result of this, if a coach or minibus is used to transport children aged 3 - 6 then each child must have a forward facing seat with a seat belt. The law only requires this to be a lap belt. In practice most minibuses have lap and diagonal belts.

Vehicles used to carry children to and from school for the local education authority are obliged to also carry the UN yellow and black pictogram in the front and back window (Thorntwaite, 2006).

2.3.5 Trains

Rail transport is an energy-efficient but capital-intensive means of transport. Due to various advantages, rail transport is a major form of public transport in many countries in Asia and many European countries.

Trains can travel at very high speeds however they are heavy and are unable to deviate from the track and require a great distance to stop. Although rail transport is considered one of the safest forms of transport, there are many possibilities for accidents.

Internationally, governments have encouraged learners to use trains by the introduction of a monthly child ticket that allows learners unlimited use on certain networks at a nominal price.

In South Africa there is insufficient capital generated into this industry for them to develop themselves to the point that they can attract sufficient numbers of learners to use this mode of transport. Safety, insufficient networks, reliability and nodal transfer have all contributed negatively to the ability of the industry to attract learners to this mode of transport and to be able to benefit from the advantages of the train.

2.3.6 Minibus Taxis

Mini bus taxis have become the main mode of public transport in South Africa and constitute 65% of all passenger journeys. The industry has been lauded as a showcase of black capitalism in South Africa. The government's recapitalisation project is in the process of being implemented.

The mini bus taxi industry is known to be a major contributor to poor road safety because of reckless driving. The poor behaviour of drivers – often due to pressure from owners to meet their quotas – is evidenced by drivers speeding, overloading and stopping anywhere in an attempt to maximize their trips and passengers transported. In addition the long working hours of drivers tend to make taxi drivers tired, irritable and not alert. In this state they are a danger to all road users especially the passengers.

This industry has the potential to make public transport more attractive with improved safety and reliability for learners.

2.4 International Initiatives

2.4.1 Safe Routes to School

The Safe Routes to School programme focuses on mapping each student's safest route between home and school or the school bus stop. The programme helps children reduce their risk in traffic and helps build the foundation and knowledge that can make them safer pedestrians and drivers throughout their lives. This programme includes traffic safety education, parent participation, field trips and development of individual maps.

Safe routes for children to cycle or walk to schools were implemented in the 1970's in continental Europe as a means of reducing child pedestrian and cyclist casualties on the school journey. Similar safe routes to school projects were also tried in the United Kingdom in the 1980's although the aim was slightly different from the schemes in continental Europe. The aim was to encourage children currently being driven to school to walk or cycle as well as improving safety for those already walking in a number of areas.

Safe route to schools is a community approach to:-

- Encourage more people to walk and cycle to school safely;
- Improve road safety and reduce child casualties;
- Improve children's health and development;
- Enable children to have better road sense and thereby contribute to their confidence;
- Reduce traffic congestion and pollution thereby resulting in cleaner air.

A safe route to school scheme in Leicester which included the introduction of area wide traffic calming resulted in a reduction of over 50% in recorded accidents on the school journey (Bradshaw, 2001).

To be successful, the input and momentum needs to come from parents, school officials and the government.

2.4.2 Junior Traffic Warden Scheme

Parental parking and traffic congestion problems around school entrances are putting the lives of children at risk. In an attempt to highlight to parents and guardians the dangers of such behaviour, a number of schools in Cardiff are currently operating this innovative scheme.

Under the supervision of Traffic Wardens, school children patrol the streets close to the school entrance and inform motorists of the dangers of parking in undesignated areas and note registration numbers of offending vehicles.

2.4.3 Walking Bus/Virtual Omnibus

This service is supported and operated by the school community. It identifies opportunities for walking the school journey and provides trained volunteers to guide and supervise children travelling to and from school.

An adult accompanies children to school, starting at one location and picking children up along the way. Soon a sizeable group of children are walking in a regular formation under the supervision of an adult. The presence of such groups affects driver behaviour, as they tend to be more mindful of children walking in a group. Parents or community members take turns to accompany the “walking school bus”.

According to Wikipedia, the walking bus concept was pioneered by the Hertfordshire County Council in 1998. The advocates of walking buses state that their aims are to:-

- Encourage physical activity by teaching children the skills to walk safely, how to identify safe routes to school, and the benefits of walking;
- Raise awareness of how walkable a community is and where improvements can be made;
- Raise concern for the environment;
- Reduce crime and take back neighbourhoods for people on foot;
- Reduce traffic congestion, pollution, and speed near schools;
- Share valuable time with local community leaders, parents, and children.

(http://en.wikipedia.org/wiki/Walking_bus.)

This measure is extremely cost effective.

2.4.4 Walk to School and Cycle to School Days

According to the International Walk to School project (<http://www.iwalktoschool.org/about.htm>) the number of cars used on the “school run” is increasing. These journeys make up 20% of peak hour traffic.

This measure is virtually a no-cost measure designed to encourage scholars, educators, parents and interested members of the community to switch to non-motorised modes of transport. Indirectly this draws attention to the improvement of infrastructure for this move.

Its origins were in the United Kingdom when the Hertfordshire County Council piloted a “walk to school week” with a few of its schools and gradually this event grew to an international event.

Benefits include cleaner air, active living, time to talk for children and parents, better road sense, growing confidence and traffic reduction.

2.4.5 School Buses

School transport in Britain as discussed under item 2.3.4.3 of this study clearly shows how a dedicated school bus service can be incorporated into the travel plan with great effect.

In the absence of specific school buses, school children are forced to use the public bus or mini bus taxi as a mode of travel to school.

According to Wikipedia, school buses are the safest form of highway transportation. The most dangerous part of the school bus ride is getting on and off the school bus. However when compared to pedestrian fatalities this percentage is considered low (http://en.wikipedia.org/wiki/School_bus).

In North America the school bus is itself a specific type of bus distinct from other buses. Canada and the United States have specially built, painted and equipped school buses. They are commonly painted a "yellow-orange" color (officially known as "National School Bus Chrome Yellow") for purposes of visibility and safety and equipped with specialized traffic warning devices, with the exception of school activity buses (normally used exclusively for point-to-point field and athletic trips and not used for home delivery routes) which are built to the same standards but are customarily some color other than yellow-orange and also often not equipped with traffic warning devices. Most school buses purchased in recent years have been diesel-powered or hybrid. Full-size school buses can seat 59 to 90 passengers, but in many districts smaller vehicles are used as well. Such smaller vehicles are commonly known as "short buses", and are often used for low-density routes associated with private schools as well as those for developmentally-challenged students.

School bus services in the UK, in almost all cases, are contracted out to local bus companies. Elsewhere in Europe school bus services are contracted to local bus companies, which use regional buses that operate on regular lines at other times, or in some cases older regional buses.

(http://en.wikipedia.org/wiki/School_bus.)

2.4.6 Educational Programmes

In the past road safety education in school was sporadic or even non-existent. It was possible for learners to go through schooling without been exposed to road safety education.

According to Arrive Alive, research has demonstrated that learners show a limited awareness regarding:-

- the importance of protective gear and reflective clothing for cyclists;
- the side of the road, for or against traffic and where (on the pavement or on the road) a cyclist should ride;
- the laws related to carrying of passengers on motorbikes;
- the importance of wearing seat belts;
- why it is important to use a pedestrian footbridge if provided and not cross at any section of the road.

Internationally and nationally governments are committed to developing long term road safety strategies that include education of children. Receiving road safety education as part of their normal school curriculum is recognized as being one of the most effective ways of providing youngsters with road safety knowledge. In this regard development of new resources using computers and other related equipment has now encouraged the use of new technology as part of the learning experience. The internet can play an important role in creating awareness of road safety and in making educational materials available to educators and learners.

(<http://www.arrivealive.co.za/pages.asp?mc=Educational&nc=EdRoadSafety.>)

2.4.7 Travel Plans

Travel plans offer a more holistic approach to transport management and have been widely adopted by schools and companies in the United Kingdom.

A travel plan is a package of measures aimed at reducing the impact of travel to a particular site. The package should be drawn up in consultation with the regular users of that site to ensure that it meets their needs and that they have a sense of ownership of the travel plan. The measures introduced vary depending on the circumstances of individual sites but are likely to include measures to encourage cycling, walking, public transport use and car sharing.

Authorities are using a number of different approaches to encourage schools to adopt travel plans. Some are targeting schools wishing to expand and requiring them to produce a travel plan in return for planning permission while others are targeting schools which have particular problems with congestion or parking outside.

A few have developed strategies which aim to eventually cover every school in their area and have designed priority assessments in order to identify which schools to target first. One such authority is Surrey County Council, which issued a challenge to every school in the county to encourage local people to come forward with their own ideas for implementing initiatives to reduce car use on the school journey. Winning entrants receive technical advice and assistance in developing their ideas from the County Council (Bradshaw, 2001).

Classroom time is always under pressure. To make room for work on the projects above, teachers need to integrate the topic into the national curriculum. There are lots of opportunities to do this and many schools have made school travel a cross-curriculum theme.

Secondary schools could also use a cross-curriculum approach, but may find it easier to develop school travel work within one or two subject areas, since the curriculum is tighter at this level.

2.5 Engineering

Ideally child pedestrian road safety has to be dealt with in a planning and land use context. However all current substandard roads will need to be developed in such a way as to allow passable levels of child safety. A number of engineering components exist within the Road Safety Strategy.

Elements of UK Road Safety Strategy in terms of engineering include:-

- Local authorities must consider using their powers to create more 30km/hr zones (with suitable traffic calming and parking restrictions around schools and in residential areas where most child accidents occur);
- Local authorities must consider providing safe crossing facilities (on busy through roads where traffic calming is not appropriate);
- Highway Agency to develop and implement child friendly areas on trunk roads near schools and in residential areas;
- Supporting local authorities putting in place home zones schemes (to slow vehicles down and give more priority for walking and cycling). Support school travel plans.

(<http://www.radstats.org.uk/no079/hewson.htm>)

Table 2.3 illustrates a variety of possible non-motorised user-friendly environments.

Table 2.3: Non-Motorised User Friendly Environments

(Cleary, 2001)

Home zones	Developed in a number of European countries and currently being piloted in the UK. Home zones typically incorporate low traffic speeds, pedestrianised areas and design features to emphasize a change in priority in favour of cyclists and pedestrians.
Pedestrianisation	Motor vehicles are excluded or areas restricted to certain types of vehicles. Pedestrianisation can be found typically near schools where there is high pedestrian activity.
Clear zones	Pollution, noise and other negative impacts of mobility are eliminated or limited using innovative technologies for example, allowing only no- or low-emission vehicles to enter, such as electric buses.
Vehicle restricted area	Areas not covered by the pedestrianisation or clear zones, where certain type vehicles are restricted from entering and/or access for vehicles is restricted to certain times of the day.
Speed management	A variety of mechanisms are available for controlling speed, including the introduction of 20mph zones, and the use of speed cameras.

2.5.1 Traffic Calming

Traffic calming involves the use of various roadway design treatments to reduce motor vehicle speed and traffic volume. When traffic calming techniques are applied on a wide basis, rather than in isolation then driver behaviour tends to be more significant in favour of pedestrians.

Traffic calming can reduce traffic speeds which mean that residents, pedestrians and cyclists can live and travel more safely.

The faster the car is travelling, the less likely drivers are to yield or stop for pedestrians and the more severe the injuries are to pedestrians. Traffic calming discourages the use of streets as short cuts thus reducing traffic levels.

Lowering speed limits, speed cameras, lane width restriction, pedestrian crossings, one way roads, roundabouts, curb bulb-outs, rumble strips and speed humps are all forms of traffic calming which offer promise if properly applied to curb speeding and some forms of aggressive driving. Pedestrians especially benefit from traffic calming. Traffic calming which employs physical changes to the roadway, signage or operation changes can be thought of as a "silent policeperson" enforcing speed limits where no law enforcement is present.

Table 2.4: Traffic Calming Strategies and Devices

(Litman,1999)

Type	Description
Curb extensions "pinch points"	Curb extensions, planters, or centreline traffic islands that narrow traffic lanes to control traffic and reduce pedestrian crossing distances. Also called "chokers."
Speed tables, raised crosswalks	Ramped surface above roadway, 7-10 cm high, 3-6 m long.
Mini-circles	Small traffic circles at intersections.
Median island	Raised island in the road centre (median) – narrows lanes and provides pedestrians with a safe place to stop.
Channelisation islands	A raised island that forces traffic in a particular direction, such as right-turn-only.
Tighter corner radii	The radius of street corners affects traffic turning speeds. A tighter radius forces drivers to reduce speed. It is particularly helpful for intersections with numerous pedestrians.
Speed humps	Curved 7-10 cm high, 3-4 m long hump.

Rumble strips	Low bumps across the road that make a noise when driven over.
Chicanes	Curb bulges or planters (usually 3) on alternating sides, forcing motorists to slow down.
Roundabouts	Medium to large circles at intersections (Kittelson, 2000).
Pavement treatments	Special pavement textures (cobble, bricks, etc.) and markings to designate special areas.
Bike lanes	Marking bikelanes narrows traffic lanes.
"Road diets"	Reducing the number and width of traffic lanes, particularly on arterials.
Horizontal shifts	Lane centreline that curves or shifts.
2-lanes narrow to 1-lane	Curb bulge or centre island narrows 2-lane road down to 1-lane, forcing traffic from each direction to take turns.
Semi-diverters, partial closures	Restrict entry/exit to/from neighbourhood. Limit traffic flow at intersections.
Street closures	Closing off streets to through vehicle traffic at intersections or mid-block.
"Neotraditional" street design	Streets with narrower lanes, shorter blocks, T-intersections, and other design features to control traffic speed and volumes.
Perceptual design features	Patterns painted into road surfaces and other perceptual design features that encourage drivers to reduce their speeds.
Street trees	Planting trees along a street to create a sense of enclosure and improve the pedestrian environment.
Woonerf	Streets with mixed vehicle and pedestrian traffic, where motorists are required to drive at very low speeds.
Speed reductions	Traffic speed reduction programmes. Increased enforcement of speeding violations.

Table 2.4 indicates measures that could be implemented to achieve traffic calming. Other measures could include speed cameras, parking restrictions, signage and regular pedestrian crossings.

Table 2.5: Traffic Calming Impacts

(Litman, 1999)

Benefits	Description
Increased <u>Road Safety</u> .	Reduced traffic accident frequency and severity, particularly for crashes involving pedestrians and cyclists.
Increased comfort and mobility for non-motorised travel.	Increased comfort and mobility for pedestrians and cyclists.
Reduced automobile impacts.	Increased non-motorised travel substitutes for automobile trips, reducing congestion, expenses and pollution.
Increased <u>Community Livability</u> .	Reduced noise and air pollution, and improved aesthetics.
Increased neighbourhood interaction.	More hospitable streets encourage street activities and community interaction.
Increased property values.	Reduced traffic speed and volumes increase residential property values.
<u>Public Health</u> .	More opportunities for walking and other physical activity.
Costs	
Project expenses.	Financial costs associated with implementing and maintaining Traffic Calming facilities.
Liability claims.	Increased liability claims caused by Traffic Calming.

Vehicle delay.	Reduced traffic speeds. Motorists either increase their travel time or reduce travel distance.
Traffic spillover on other streets.	Traffic Calming on one street can shift traffic to other streets.
Problems for emergency and service vehicles.	Delay to fire trucks, and problems for buses, garbage trucks and snow ploughs.
Increased drivers' effort and frustration.	Increased effort required for driving on traffic calmed roads and the resulting frustration.
Problems for bicyclists and visually impaired pedestrians.	Some Traffic Calming strategies cause problems to bicyclists or visually impaired pedestrians.

Table 2.5 highlights the benefits and cost implications of traffic calming.

CHAPTER 3 : PILOT SURVEY

3.1 Introduction

A pilot survey was conducted amongst 295 pupils ranging from Grade 1 to Grade 12 to test the survey format and to make sure that the questions were unambiguous. Parents assisted scholars to complete the questionnaire survey till Grade 4. However this had a negative impact on the timing, logistics and response rate. For grades five onwards scholars responded to the questionnaire with the assistance of the researcher and educators. The researcher, staff and management of the school responded to the site assessment checklist included as Appendix C.

The questionnaire (See Appendix A) was specifically targeted at scholars to establish:-

- Demographics;
- Mode of travel to school;
- Assessment of alternate modes of transport;
- Origin, destination and route details;
- Travel cost and duration;
- Factors influencing choice of school;
- Problems experienced on route to school in terms of road safety.

The schools in the pilot survey are shown in Table 3.1 below:-

Table 3.1: Schools in Pilot Survey

Name of School	Location	Level	No of Questionnaires Answered	Percentage Response Rate
Thandawazi Primary	Kwa Mashu	Senior Primary	77	13
Isibonela Secondary	Kwa Mashu	Secondary	98	9
Ferndale Combined School	Phoenix	Primary and Secondary	72	12
Christopher Nxumalo	Chesterville	Primary	48	10
*Umlazi Comtech	Umlazi	Secondary		

* A response rate of 10% was preferred; however an absolute minimum of 8% response rate was accepted for analysis. Four of the 5 schools satisfied this requirement and therefore Umlazi Comtech was excluded.

The pilot survey has been limited to the following areas:

- Umlazi
- Phoenix
- KwaMashu
- Chesterville

These areas were identified as having high accident areas in the vicinity of schools.

3.2 Findings

The pilot survey was targeted at government schools in the north and south central areas of the eThekwin Municipality. The road accidents statistics were referenced on a map showing positions of schools. The respondents comprised 61% females and 39% males and varied from Grade 1 to Grade 12. The majority of the respondents (65%) have over four members in the household.

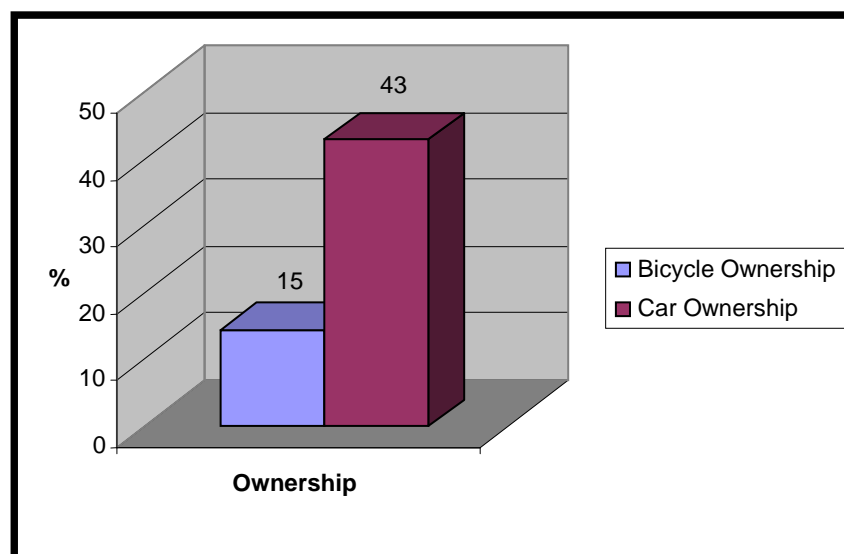


Figure 3.1: Car and Bicycle Ownership

Figure 3.1 illustrates that 15% of households own a bicycle while 43% own a car. If this result was linked to socio economic factors, one would expect bicycle ownership to be greater. It would appear that the economic, environmental and physical benefit of cycling has not been taken advantage of, perhaps because – among other reasons – the road infrastructure is not conducive to cycling.

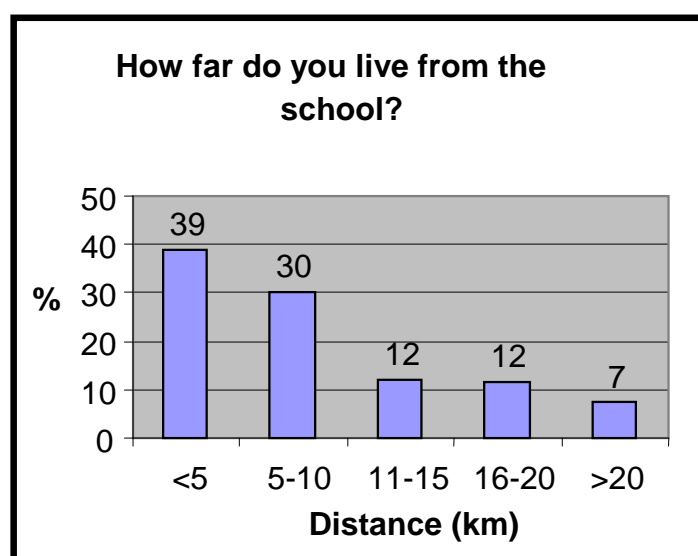


Figure 3.2: Distance Travelled

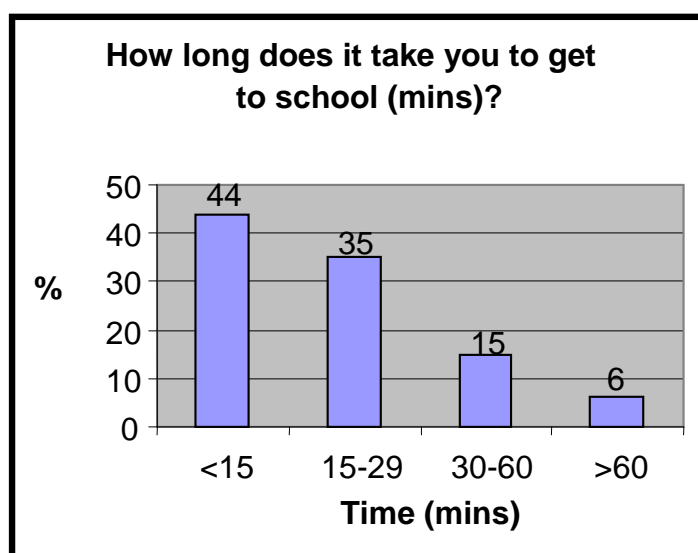


Figure 3.3: Time Taken

Figure 3.2 shows that the largest group of respondents (39%) live less than 5 km from the school while Figure 3.3 shows that 44% of respondents take less than 15 minutes to get to school. In terms of the Learner Transport

Assistance Plan all primary school learners should walk for less than 30 minutes and all secondary school learners should walk for less than 45 minutes (see Table 2.1). Figure 3.3 above shows that most learners have not exceeded the recommended time duration to travel to school. However it should be pointed out that this may not be true for the rural areas where studies have shown that scholars travel long distances and spend a greater duration of time on school travel.

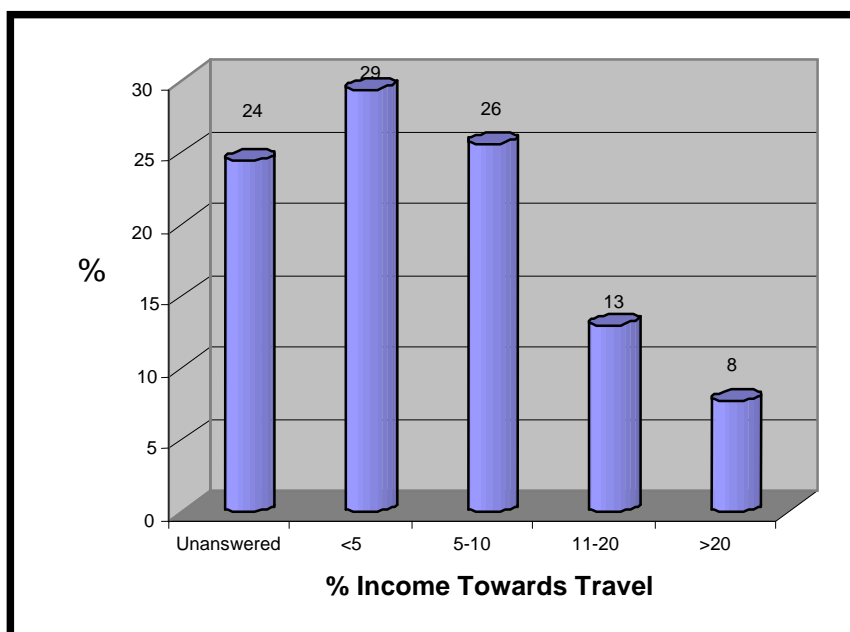


Figure 3.4: % Income Used Towards Travel

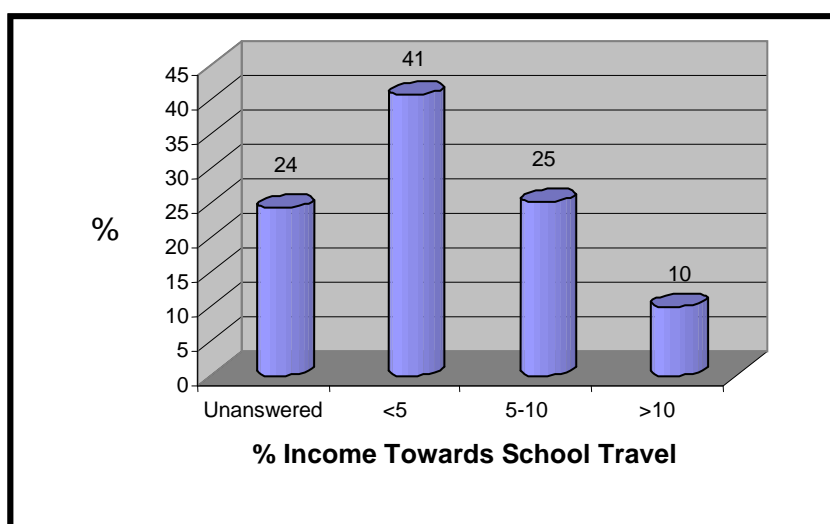


Figure 3.5: % Income Used Towards School Travel

The Transport Bill aims to improve existing road networks, relieve congestion and encourage the use of public transport. It states, for example, that not

more than 10% of disposal household income should be used on public transport (Department of Transport, 1996).

Figure 3.4 and Figure 3.5 reflect that 24% of respondents were unable to estimate the percentage income used towards school travel and general travel. In terms of the white paper policy 21% of the respondents are over the benchmark for school travel (Figure 3.4) while Figure 3.5 shows that 10% of the respondents are over the benchmark for all travel.

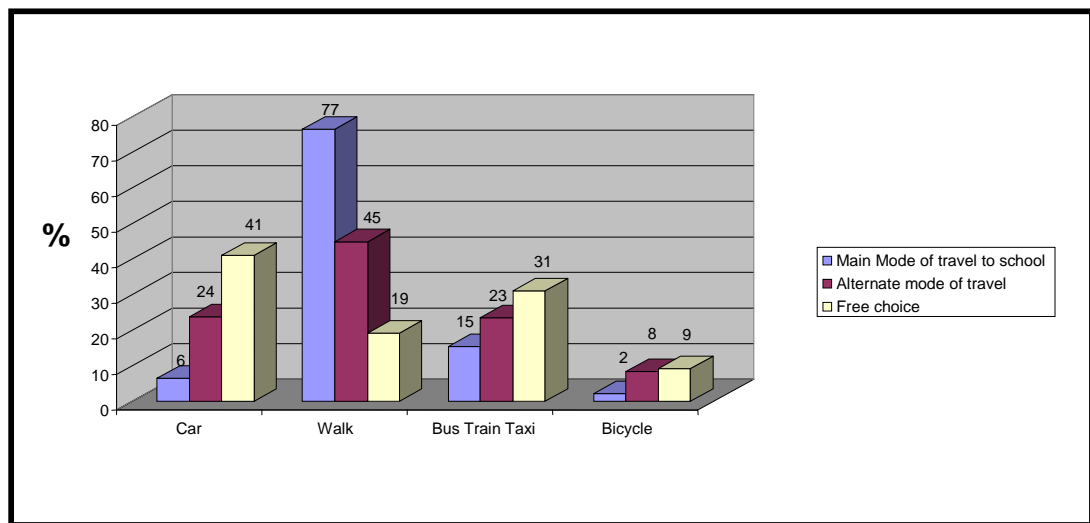


Figure 3.6: Mode of Travel

Figure 3.6 compares the present main mode of travel to school and the mode selected if respondents were given a free choice. Seventy seven percent of the respondents' main mode of travel is walking. If respondents were given a free choice then this percentage drops to 19%. The pedestrian respondents attributed problems on route to school to driver behaviour, road crossing facilities and fatigue. Approximately 6% of the respondents' main mode of travel to school is by car. This percentage increases to 41% if respondents were given a free choice. The notion of convenience over environment, safety and fitness issues needs to be investigated for the promotion of non-motorised travel to be effective. It would appear that as socio-economic conditions improve, scholars prefer to travel by car than to walk.

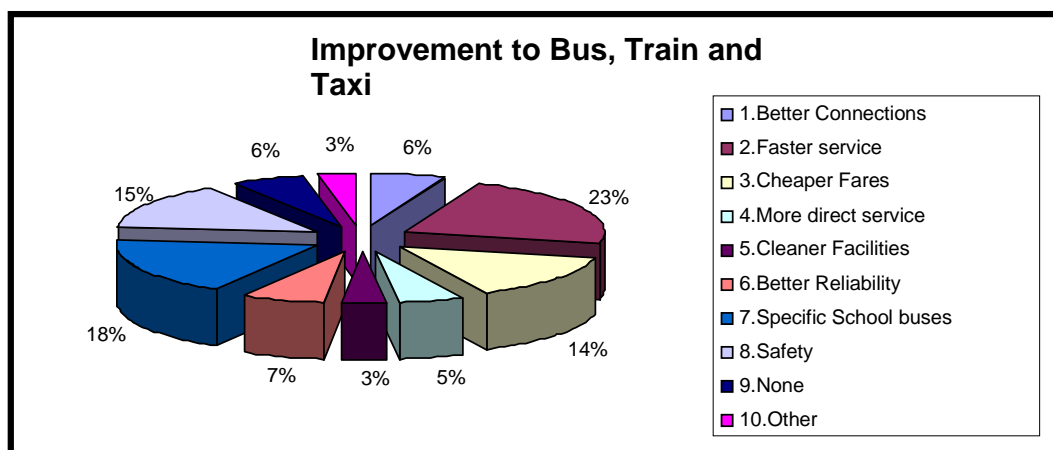


Figure 3.7: Possible Incentives to Improve Bus, Trains and Taxis

Figure 3.7 shows which incentives would encourage scholars to use bus, train and taxi services. The figure indicates that 23% of respondents considered faster service to be the main incentive. Internationally specific school buses have encouraged many scholars to use public transport and this incentive attracted 18% of the respondents. In the current times of high accident and crime one would expect that safety would be high on the agenda, however faster service and specific school buses took preference over safety and consequently safety accounts for only 15%. Cleaner facilities would attract 3% of the respondents to use public transport.

Table 3.2: Factors Encouraging Car Share/Lift Clubs (%)

Name of School	1. Help in Finding Car Share Partners	2. Standby Arrangements	3. Reserved Parking for Car Shares	4. None	5. Other
Christopher Nxumalo	40	17	30	10	3
Ferndale	26	14	25	29	6
Isibonela	49	15	12	20	4
Thandawazi	24	22	21	19	14
Average	35	17	22	19	7

Table 3.2 illustrates the percentage response for each school when investigating the factors that would make scholars more likely to form lift clubs thereby reducing the vehicles on the road. It was established that on average 35% of the respondents would be more likely to car share if they received assistance in finding car share partners. School assistance in this regard would enhance the potential for lift clubs. On average 19% were not interested in lift clubs.

Table 3.3: Factors Encouraging Scholars to Walk to School (%)

	1. More Footpaths around your School	2. More Footpaths on the Journey to School	3. Better Road Crossing Facilities	4. More Scholar Patrol and Increased Security	5. None	6. Other
Christopher Nxumalo	15	20	25	33	5	2
Ferndale	5	21	40	22	9	3
Isibonela	23	10	58	7	2	0
Thandawazi	14	19	19	21	14	13
Average	14	17	36	21	8	4

Thandawazi and Isibonela are in close proximity to one another and a person from the community (pointsperson) assists scholars to cross the road leading to the school.

Table 3.3 illustrates that on average 36% felt that better road crossing facilities would encourage them to walk to school with Isibonela Secondary (58%) contributing most to this high percentage. One would have expected Thandawazi Senior Primary to display a higher concern for this factor compared to Isibonela High School considering the age difference. It was surprising that at Thandawazi 21% of the respondents' main encouragement to walk to school was more scholar patrols and increased security. This could possibly be attributed to a local security issue.

Table 3.4: Factors Encouraging Scholars to Cycle to School (%)

	1. Changing Facilities at School	2. Arrangements to buy a Bicycle at Discount	3. Secure Cycle Parking	4. Better Roads Facilities e.g. cycle tracks	5. None	6. Other
Christopher Nxumalo	11	18	28	21	18	4
Ferndale	12	9	26	23	24	6
Isibonela	23	10	58	7	2	0
Thandawazi	21	16	17	17	18	11
Average	17	13	32	17	16	5

Table 3.4 shows that on average 16% of respondents were not interested in cycling to school. It was expected that since bicycle ownership is low,

economic factors such as “arrangements to buy a bicycle at a discount” would take preference but this was not the case, with Table 3.4 reflecting that on average only 13% of respondents were encouraged by this. In contrast, 32% of respondents’ main encouragement was secure cycle parking and this could be attributed to security concerns in the area. This is illustrated by respondents from Isibonela Secondary where 58% were concerned about secure cycle parking.

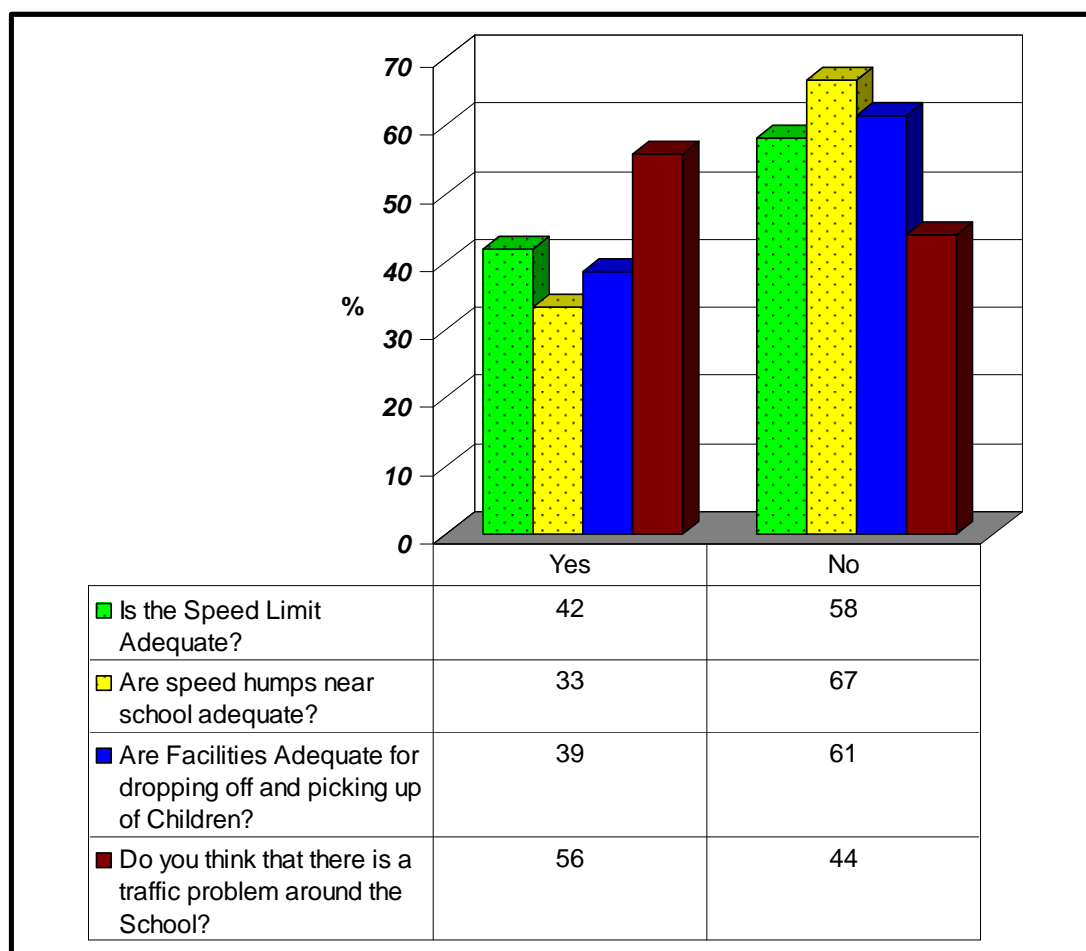


Figure 3.8: General Comments

On-site observation confirms the problems raised by respondents regarding speed limits and speed humps in the vicinity of their schools. Figure 3.8 illustrates that 58% perceived the speed limit to be inappropriate while 67% were concerned that the speed humps near schools were not adequate. The above figure also shows that 61% of respondents found that the facilities for dropping off and picking up of the children to be inadequate. The majority of respondents (56%) felt that there is a traffic problem around the school.

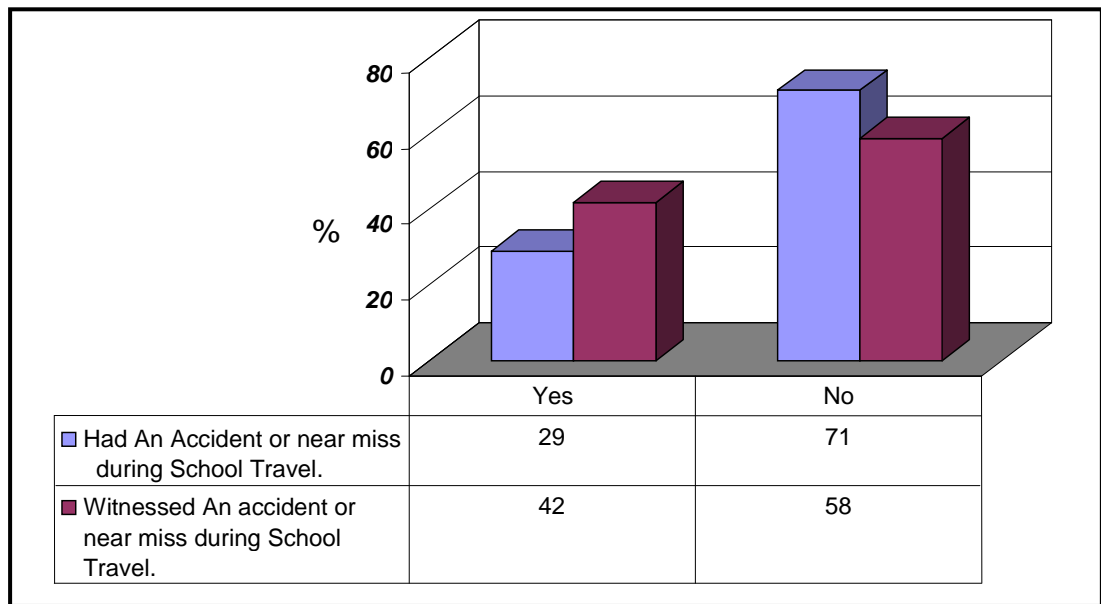


Figure 3.9: Accidents or Near Misses at Schools

Figure 3.9 illustrates that 29% of respondents had an accident or near miss during school travel and 42% witnessed an accident or near miss during school travel. Respondents were asked to give details in order for the researcher to assess whether a near miss was road safety related.

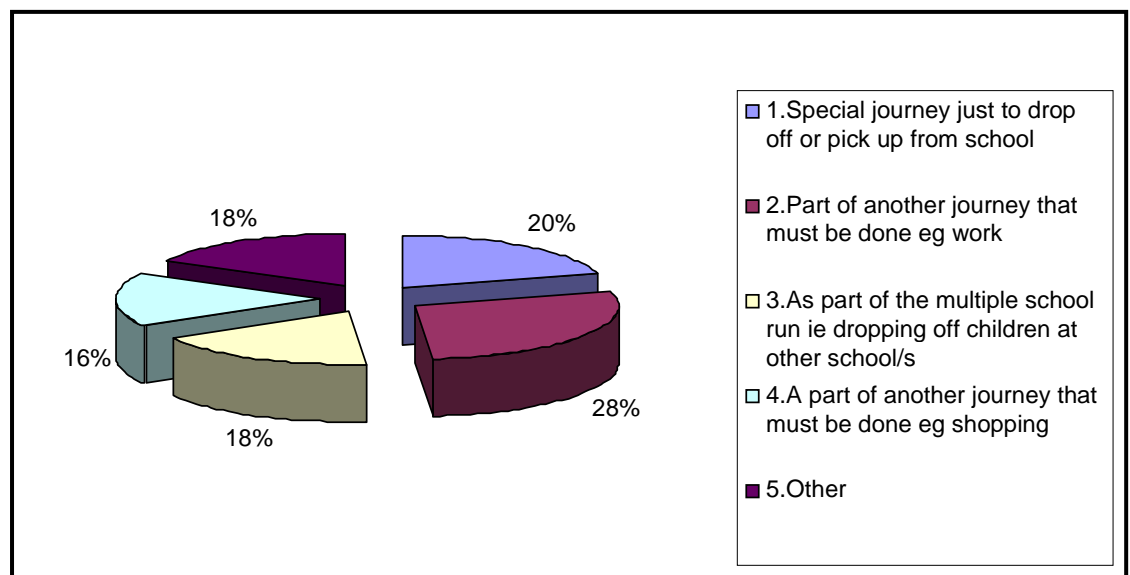


Figure 3.10: Purpose of Journey for Car Users

The question illustrated in Figure 3.10 was directed at car users. The biggest response (28%) was that the journey is part of another journey that must be done e.g. to work, while 20% of journeys are specifically for school rounds.

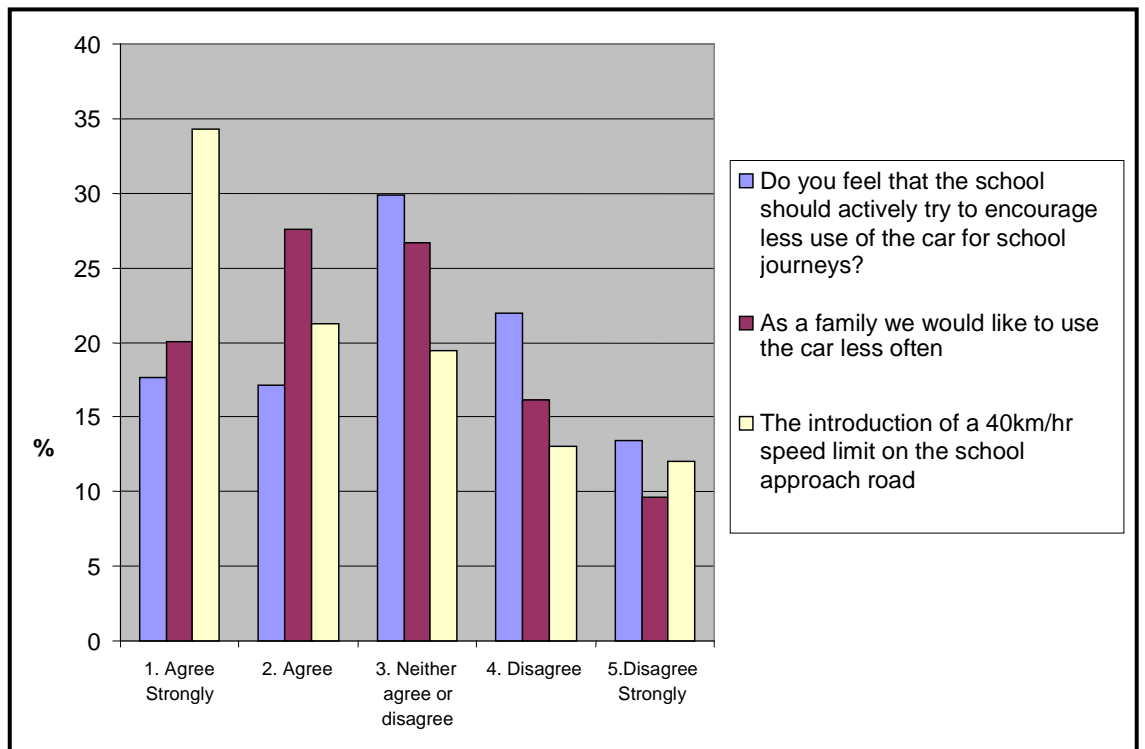


Figure 3.11: Comments by Car Users

Figure 3.11 illustrates that 30% of car user respondents neither agreed nor disagreed with the concept that the school should actively encourage less use of the car for school journeys. These respondents remained neutral. On average 18% agreed strongly while 17% agreed that the school should actively try to encourage less use of the car for school journeys. On average 22% of the respondents disagreed and another 13% disagreed strongly with the role of the school in discouraging use of the car.

Figure 3.11 further illustrates that 27% of respondents were neutral regarding their desire to use the car less often. It is encouraging to see that 48% of respondents either agreed or agreed strongly that the family would like to use the care less often.

From Figure 3.11 it evident that 19% of respondents neither agreed nor disagreed to the introduction of a 40km/hr speed limit on the school approach route. The majority (56%) of the respondents either agreed or agreed strongly with the introduction of a 40km/hr speed limit. The need for this was evident from on-site observations.

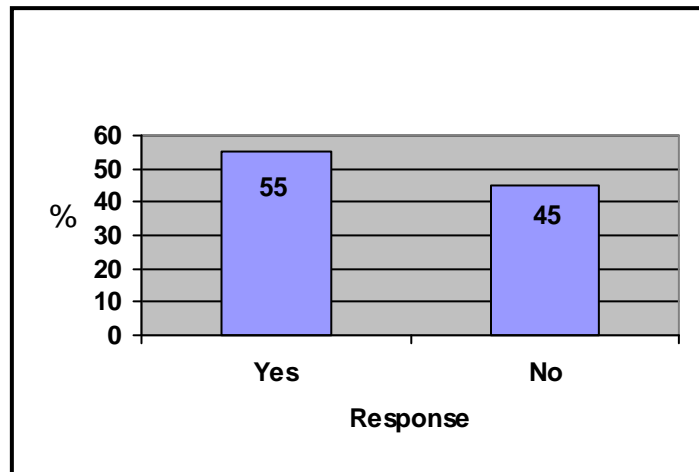


Figure 3.12: Potential for a Walking Bus

The question regarding the potential of a walking bus in which children are escorted as a group by trained and approved parents to school was targeted at car users. Collection could be from a convenient collection point such as a hall or car park. Figure 3.12 illustrates that 55% of the car users responded positively to the use of a “walking bus”. This project has the potential to reduce the congestion on roads during peak times thereby reducing the interaction between cars and pedestrians.

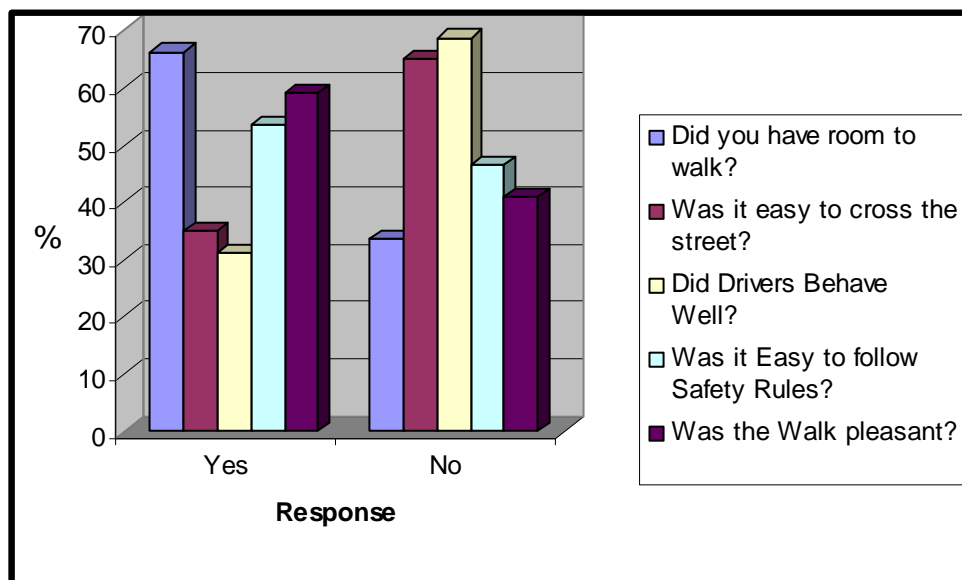


Figure 3.13: Problems Experienced by Pedestrians on Route to School

The study also investigated problems experienced by pedestrians on route to school. Figure 3.13 illustrates that over 60% of respondents agreed that there was sufficient room to walk, however over 60% complained that it was not

easy to cross streets. On-site observation confirms that the number of lanes together with the high volume of traffic makes it difficult in most cases for scholars to cross roads. A high percentage of respondents felt that drivers did not behave well (69%). On-site observations confirm that drivers showed disregard for the pointsperson. In addition speed limits were not adhered to and many showed disregard to the general rules of the road regarding pedestrian crossings. On a positive note the majority (56%) felt that the walk to school was a pleasant experience.

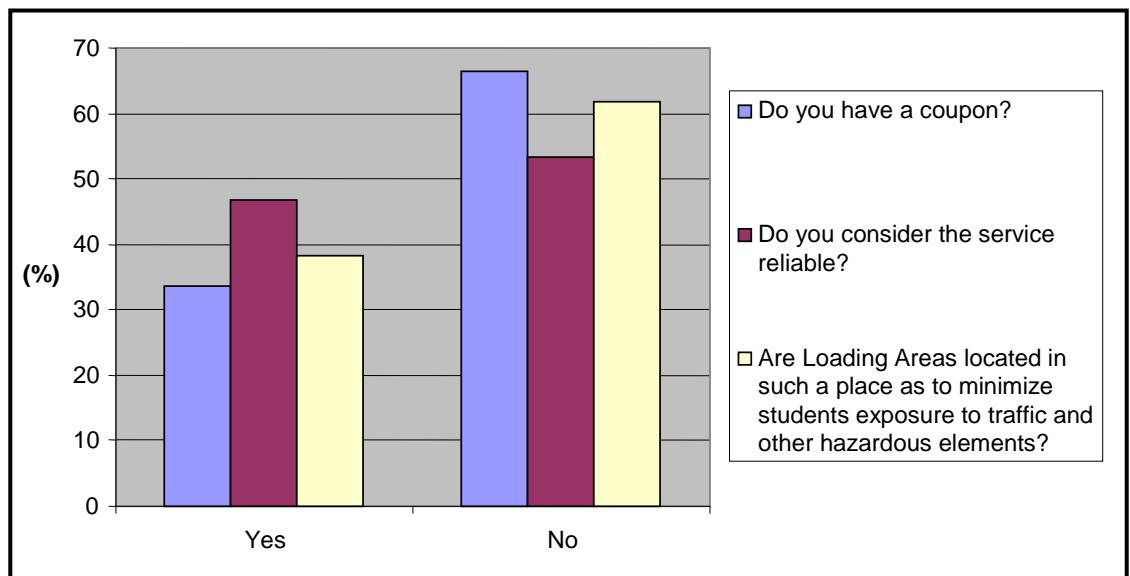


Figure 3.14: General Questions Asked to Bus, Train and Taxi Users

Figure 3.14 above illustrates that over 30% of respondents have a coupon. Although this percentage seems low one has to consider that this section was answered by bus, train and taxi users and since the taxi industry has no coupon system in place this will have a negative impact on the figure. Over 50% of the respondents considered the service unreliable while just above 60% of the respondents felt that loading areas were not located in such a place as to minimize students' exposure to traffic and other hazardous elements.

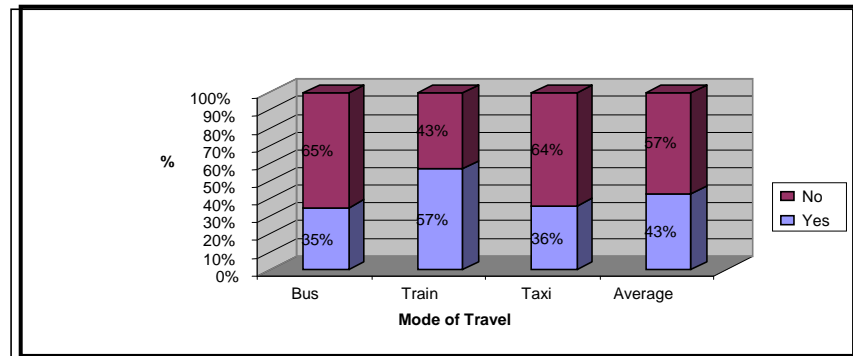


Figure 3.15: Service Reliability

Figure 3.15 shows a comparative analysis of the service reliability for bus, train and taxi users. On average 57% of respondents found the service unreliable. The majority (65%) of bus users considered the service unreliable while 64% of taxi users considered the service unreliable. According to respondents, road based public transport is more unreliable. It would appear that as service reliability increases so too would the preference for travel mode change.

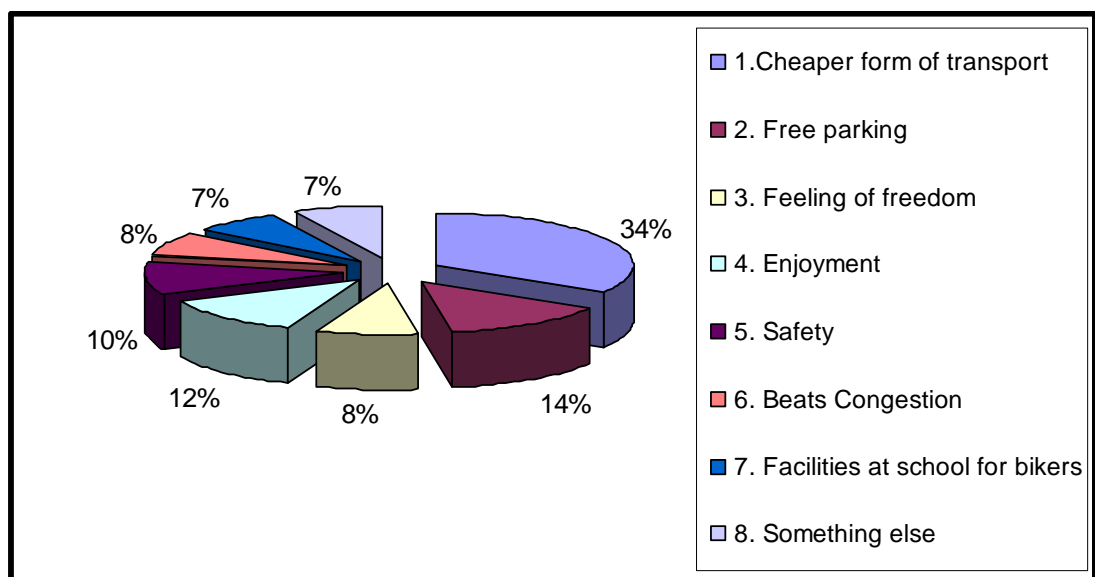


Figure 3.16: Motivations to Cycle to School

The analysis above (Figure 3.16) was targeted at the cyclist. The purpose of this was to ascertain the motivation for cycling to school. The main motivation for cycling to school was that it was a cheaper form of transport (34%).

3.3 Site Assessment

On-site assessments were conducted as part of this research. This included condition and geometrics of the roads, signage, traffic calming, entrance facilities at schools and audit of a formal travel plan.

The assessment confirmed the following:-

- Speed limits around 4 of the 5 schools were considered undesirable;
- Signage generally included a school marking on the road and a pedestrian sign. Signage associated with traffic calming e.g. reduction in speed, speed humps etc. was lacking;
- On-site observations confirm that crossing the street was difficult. KwaMashu and Mangosuthu Highways were considered too wide. The speed limit of 60km/hr was generally not adhered to;
- None of the schools had any bicycle racks;
- None of the schools had a formal school travel plan;
- School officials were appointed in 3 of the 5 schools to assist learners at the entrance of the school during mornings and afternoons.

CHAPTER 4 : FOCAL SURVEY

4.1 Introduction

The outcome of the pilot survey was that some questions were unclear and a few questions were simplified. The revised questionnaire is included as Appendix B.

Once the questionnaire was revised the focal survey was conducted. In many of the schools English was not the first language and therefore the questionnaire was also translated into Zulu.

The following schools formed part of the focal survey:-

Table 4.1: Names of Schools for Focal Survey

Name of School	Location	Level	Type	No of Questionnaires Answered
Sondelani	Ntuzuma	Senior Primary	Government	60
Bhekisisa	Ntuzuma	Secondary	Government	40
Siphosethu P	Ntuzuma	Primary	Government	36
Langalibalela SP	Inanda	Senior Primary	Government	86
Ohlanga High School	Inanda	Secondary	Government	129
Springfield Primary School	Springfield	Primary	Government	65
Al Falaah	Springfield	Combined	Private	82
Coedmore Primary	Chatsworth	Primary	Government	79
Grandmore Primary	Phoenix	Primary	Government	112
Umlazi Comtech	Umlazi	Secondary	Government	266

4.2 Findings

A total of 955 students responded to the questionnaire survey.

The main survey was targeted at predominantly government schools in the north and south central areas of the eThekweni Municipality. Generally the statistics referenced on the map of schools and on-site observations showed that the schools selected were in areas with high pedestrian traffic coupled with poor road infrastructure. The respondents comprised 57% females and 43% males and varied from Grade 1 to Grade 12.

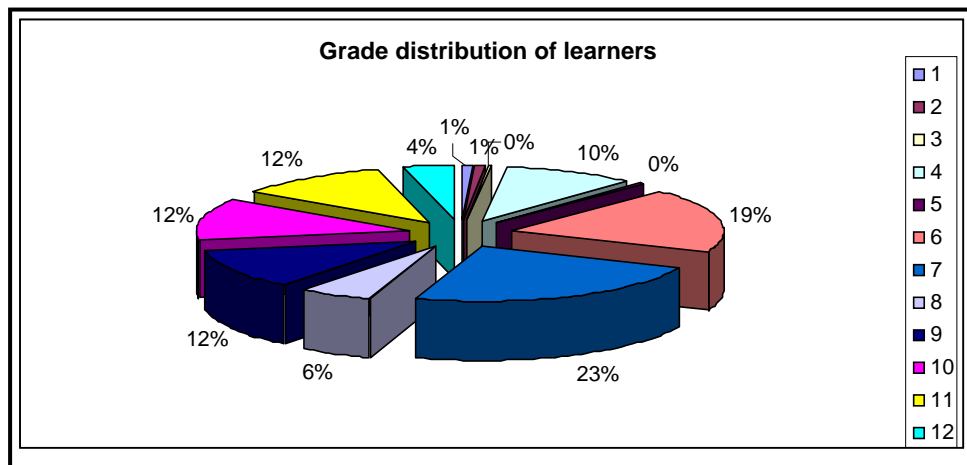


Figure 4.1: Grade Distribution of Learners

Figure 4.1 shows the grade distribution of the respondents varying from Grade 1 to Grade 12. The biggest group of respondents was from Grade 7 (23%).

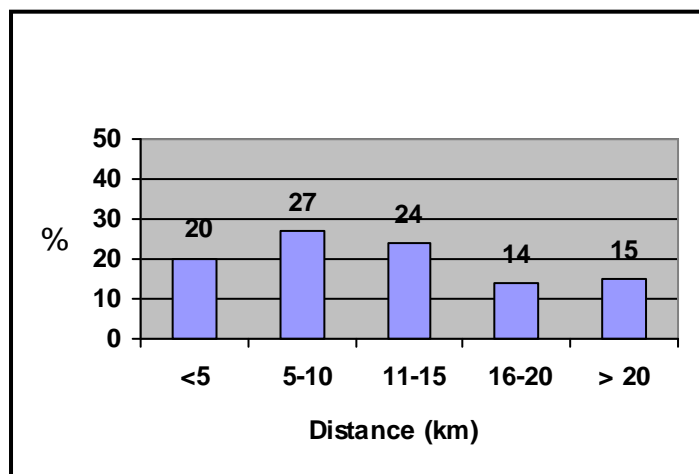


Figure 4.2: How far do you live from the school?

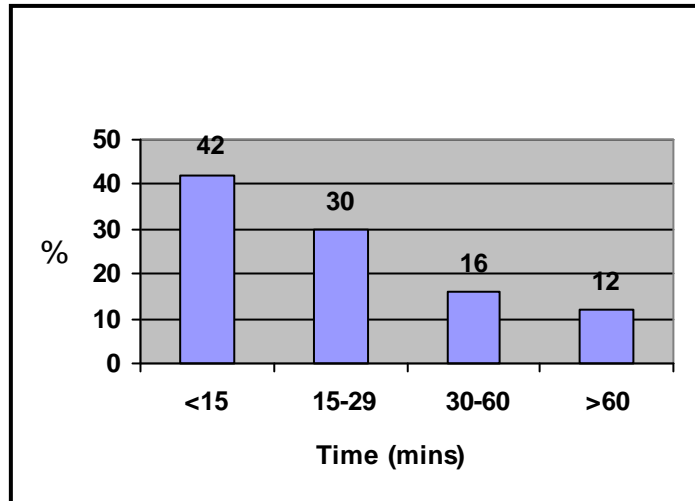


Figure 4.3: How long does it take you to get to school?

Figure 4.2 shows that the majority of respondents (27%) live 5 to 10km from the school while Figure 4.3 shows that 42% of the respondents take less than 15 minutes to get to school. These results generally compare favourably to that of the pilot study. However these results would not hold for rural areas where scholars travel over long distances and spend a large proportion of time on school travel. When we compare this result to Table 2.1 we find that approximately 28% are above the guidelines of less than 30 minutes.

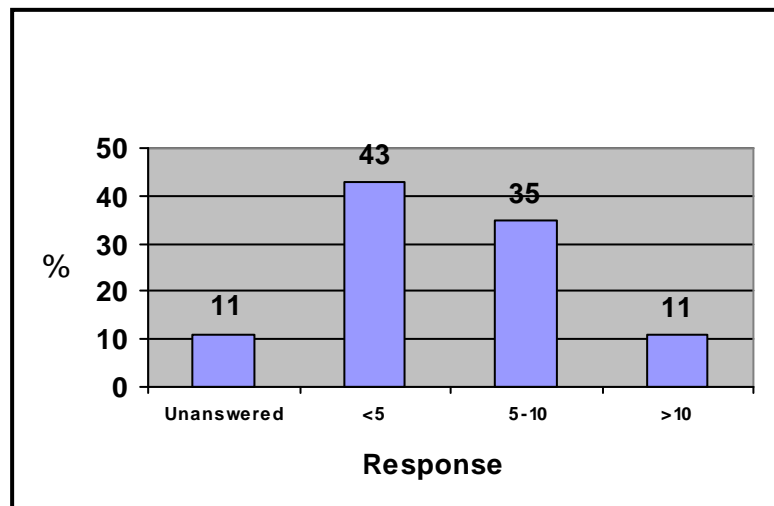


Figure 4.4: % Income used Towards School Travel

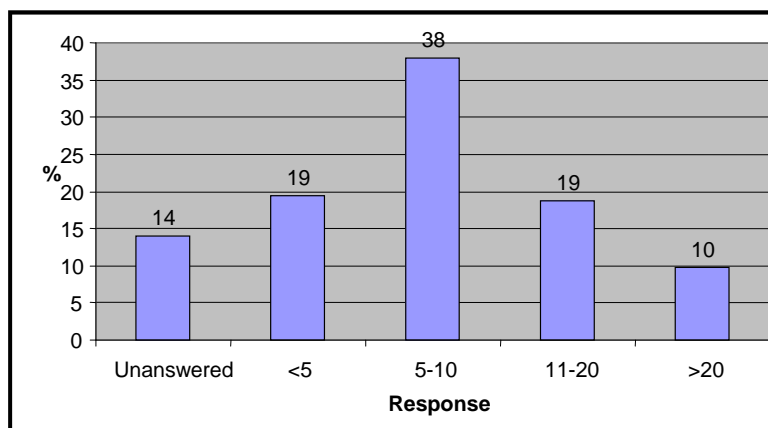


Figure 4.5: % Income used Towards Travel

The Transport Bill aims to improve existing road networks, relieve congestion and encourage the use of public transport. It states, for example, that not more than 10% of household disposable income should be used on public transport (Department of Transport, 1996).

In terms of Figure 4.4, 11% of the respondents were unable to estimate the percentage income used towards school travel while Figure 4.5 shows that 14% were unable to estimate the percentage income used towards general travel. In terms of the white paper policy 11% of the respondents are over the benchmark for school travel while 29% of the respondents are over the 10% benchmark for all travel.

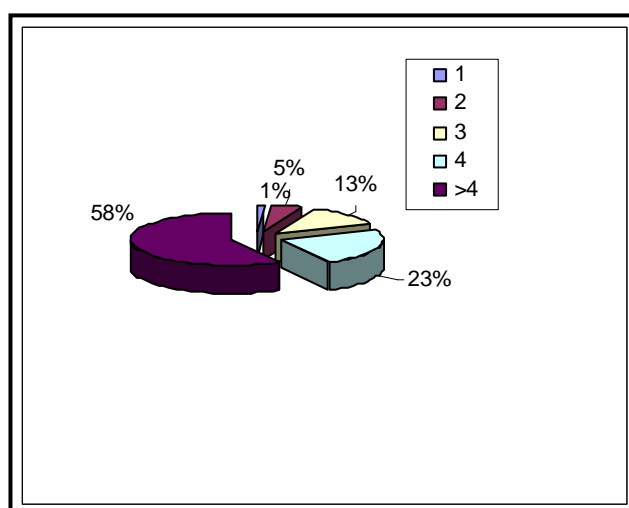


Figure 4.6: How Many Members are there in your Household?

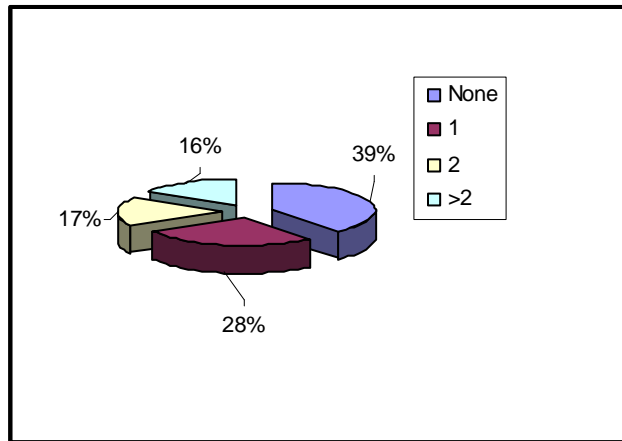


Figure 4.7: How many Cars are there in your Household?

Figure 4.6 illustrates that 58% of the households have more than 4 members in their households while Figures 4.7 illustrates that 39% of the households do not own a car.

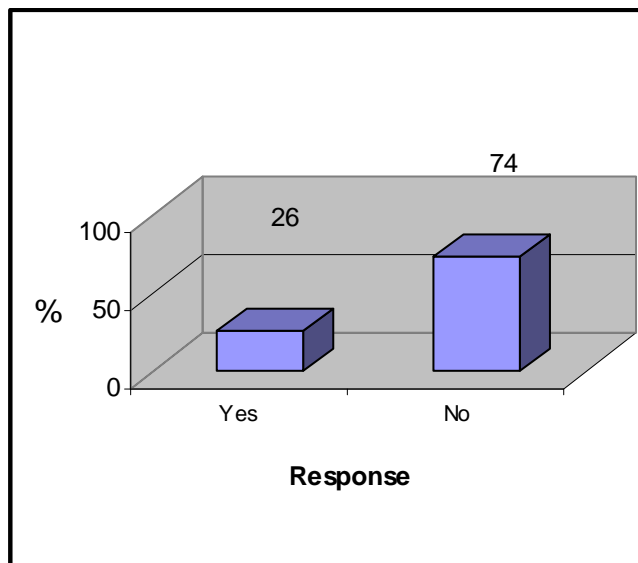


Figure 4.8: Do you own a Bicycle?

Figure 4.8 illustrates that 26% of households own a bicycle. If this result was linked to socio-economic factors, one would expect bicycle ownership to be greater.

It would appear that the economic, environmental and physical benefit of cycling has not been taken advantage of, one possible reason being that the road infrastructure is not conducive to cycling. This links closely with the

literature review (Item 2.3.2) were cycling is perceived to be highly dangerous.

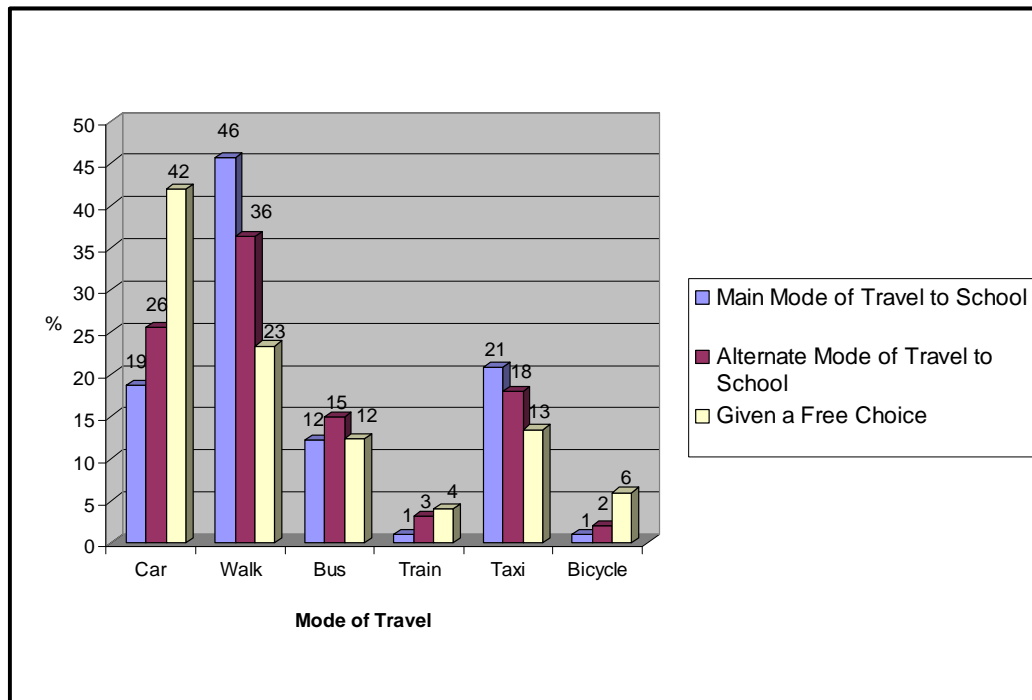


Figure 4.9: Main Mode of Travel to School and Preferred Mode

Figure 4.9 compares the present main mode of travel to school, the alternate mode of travel to school and the mode selection if respondents were given a free choice. Forty six percent of the respondent's main mode of scholar travel is walking. If respondents were given a free choice this percentage drops to 23%. When comparing the main mode to the alternate mode it seems that the walkers reduce to 36% from 46%. However the car users increase from 19% to 26%. This could be attributed to weather as detriment for scholars to walk to school. The pedestrian respondents attributed problems they encountered on route to school to driver behaviour, inadequate road crossing facilities and fatigue. Approximately 19% of the respondents' main mode of travel to school is by car. This percentage increases to over 42% if respondents were given a free choice. The notion of convenience over environment, safety and fitness issues needs to be investigated for the promotion of non-motorised travel to be effective. It would appear that as socio-economic conditions improve, scholars prefer to travel by car rather than walk.

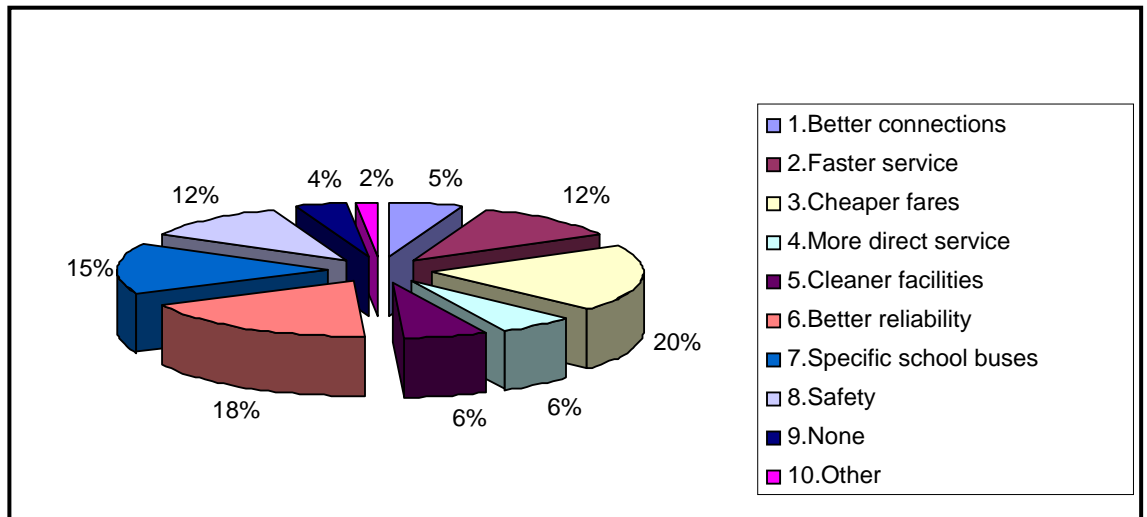


Figure 4.10: Factors Encouraging Scholars to use the Bus, Train or Taxi to Travel to School

Figure 4.10 shows 8 factors which would encourage scholars to use public transport. The biggest factor is cheaper fares, selected by 20% of respondents. Internationally, specific school buses have proved to be the safest form of transportation (Item 2.4.5) and this factor would encourage 15% of the respondents, while safety and cleaner facilities accounted for 12% each for encouragement to use public transport.

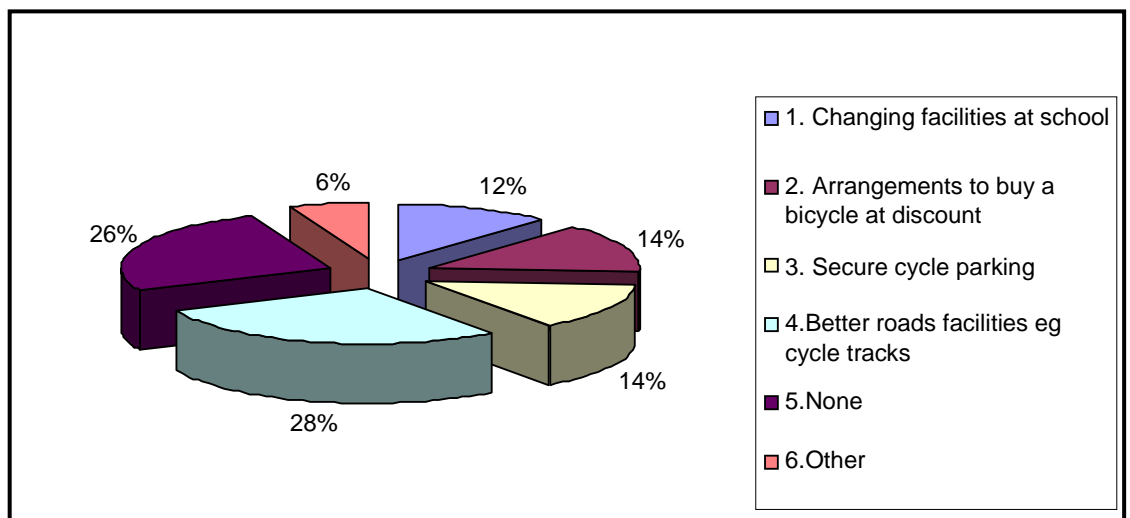


Figure 4.11: Factors Encouraging Scholars to Cycle to School

While better road facilities in terms of cycle tracks is the main encouragement for cycling to school, 26% of the respondents were not interested in cycling to school. It was expected that since bicycle ownership is low, economic factors such as “arrangements to buy a bicycle at a discount” would score more highly, but this was not the case with Figure 4.11 reflecting that on average only 14% were encouraged by this. In contrast, 14% of the respondents’ main

encouragement was secure cycle parking and this could be attributed to security concerns in the area.

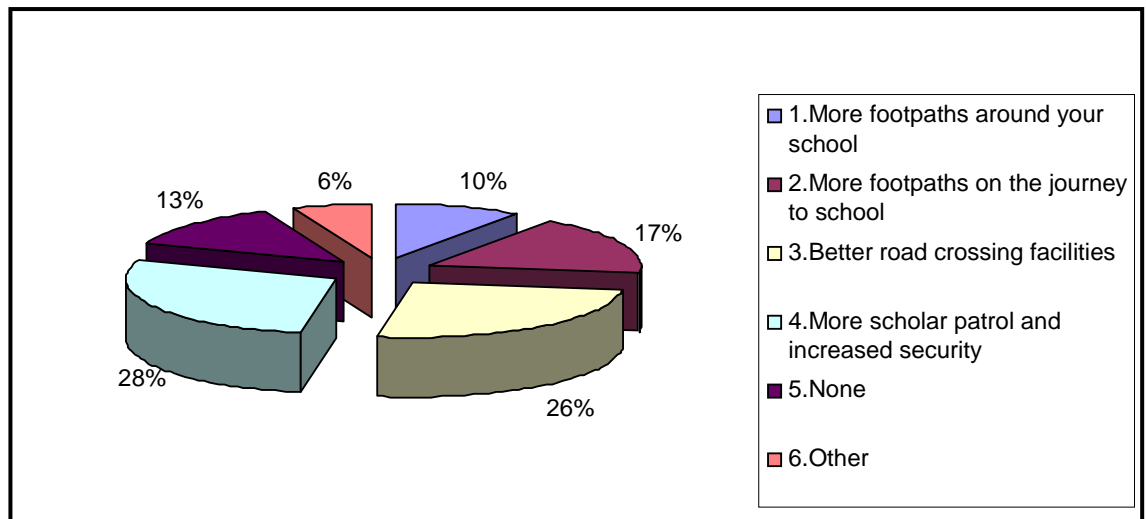


Figure 4.12: Improvements to Pedestrian Facilities

Figure 4.12 illustrates that more scholar patrols and increased security would encourage 28% of respondents to walk to school. This could possibly be attributed to a security issue. The researcher's on-site observations confirm that minimum assistance is given to scholars from adults regarding crossing the road. Scholar patrols were non-existent while just one retired member of the community was appointed as a pointsperson.

On average 26% of respondents felt that better road crossing facilities would encourage them to walk to school.

Figure 4.12 above shows that 10% of respondents would like to see more footpaths around the school while 17% would prefer more footpaths on the journey to school. Thus, 27% of respondents would be encouraged to walk to school if there was less interaction between drivers and pedestrians.

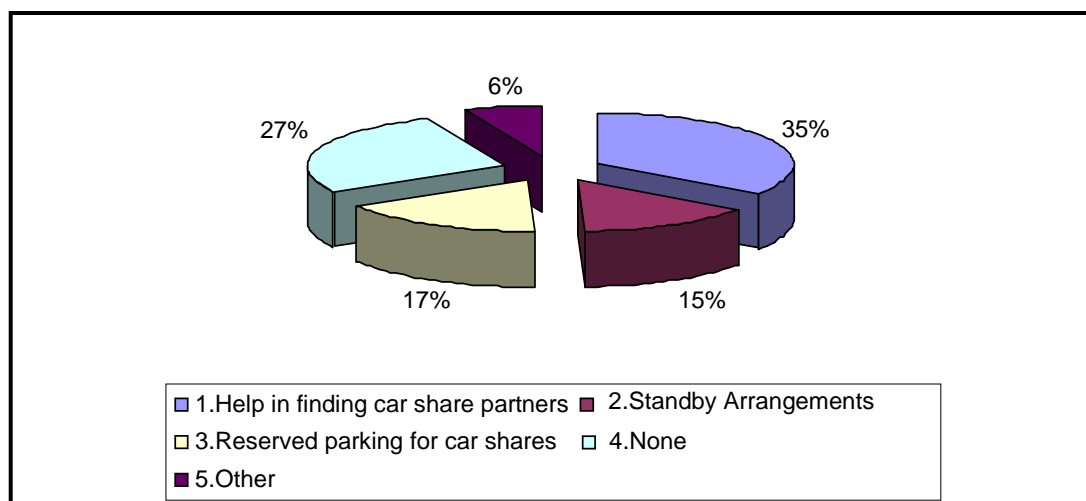


Figure 4.13: Factors Encouraging Scholars to Join Car/Lift Clubs

The school can play a vital role to encourage lift clubs by helping parents to find lift club partners through newsletters. Figure 4.13 shows that 35% of respondents would be encouraged to use this measure if they got help while 27% are not interested in lift clubs.

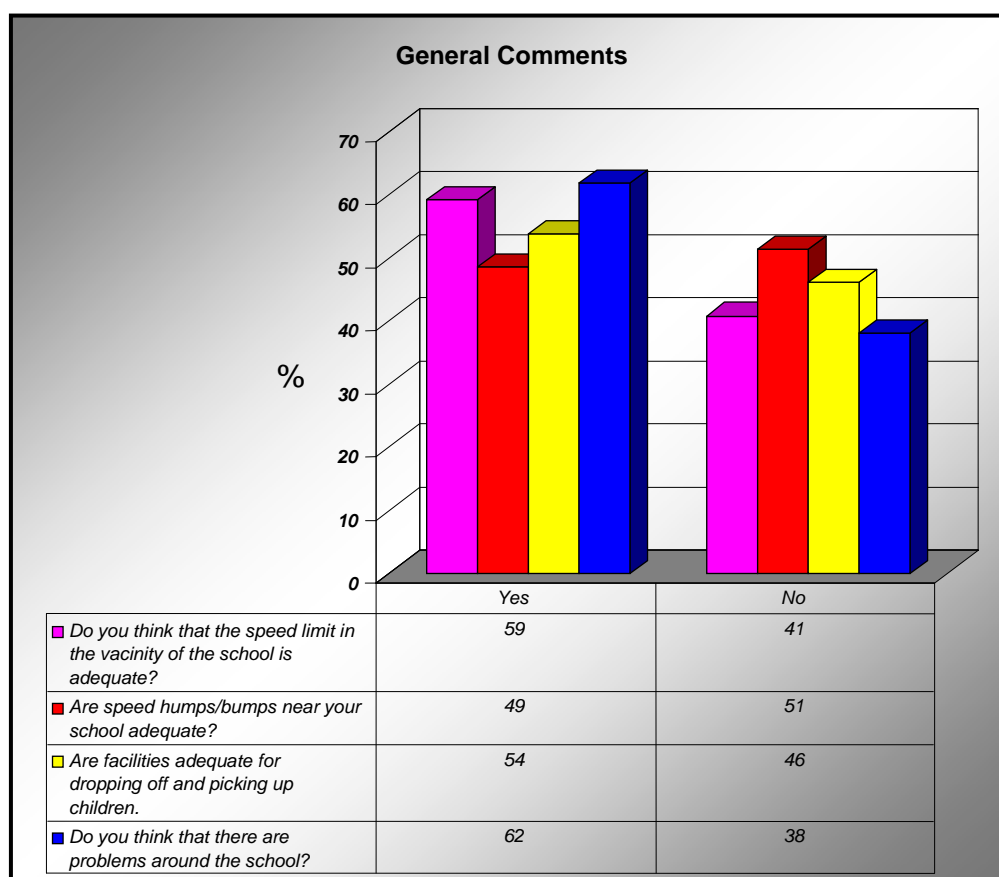


Figure 4.14: Adequacy of Speed Limit and Speed Humps

On-site observation confirms the problems raised by respondents regarding speed limits and speed humps near the school. Figure 4.14 illustrates that 41% perceived the speed limit to be inappropriate while 51% were concerned that the speed humps near schools were not adequate. Facilities for dropping off scholars were considered inadequate by 46% of respondents while 62% agreed that there was a traffic problem around the school.

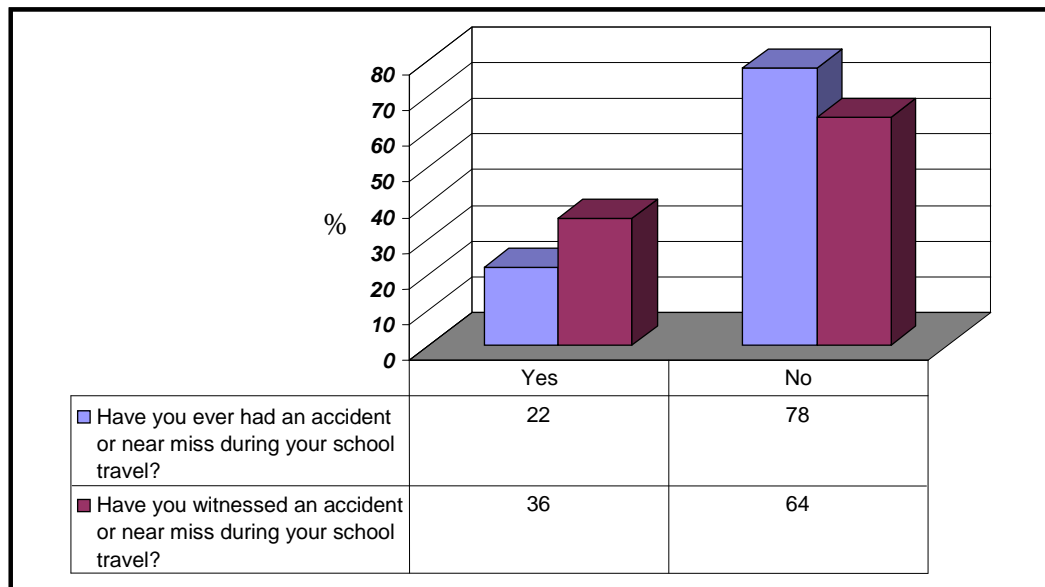


Figure 4.15: Accidents or Near Misses at Schools

Figure 4.15 illustrates that 22% of respondents had an accident or near miss and 36% had witnessed an accident or near miss during school travel. Respondents were asked to give details in order for the researcher to assess whether a near miss was road safety related.

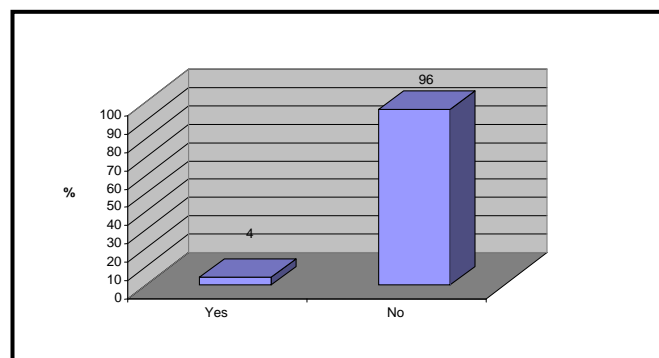


Figure 4.16: Do You Come to School in a LDV?

In the pilot survey the transport of scholars in light delivery vehicles was not explored. However due to high media coverage and the fact that the

eThekweni 2003 statistics highlighted that 20% of all children injured in accidents were occupants of light delivery vehicles, this was included in the main survey. Figure 4.16 indicates that 4% of the respondents come to school in a light delivery vehicle.

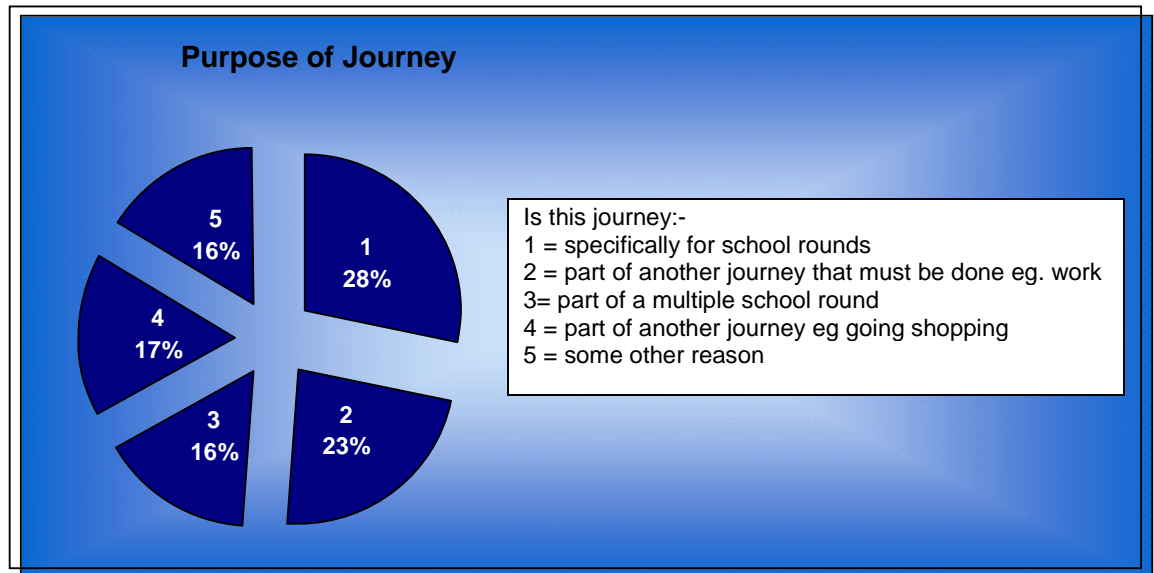


Figure 4.17: Purpose of Journey (Car Users)

Figure 4.17 above shows a range of reasons for the purpose of journeys for car users. The main reason (28%) is specifically for school rounds while 23% of the car user's journey is part of another journey e.g. going to work.

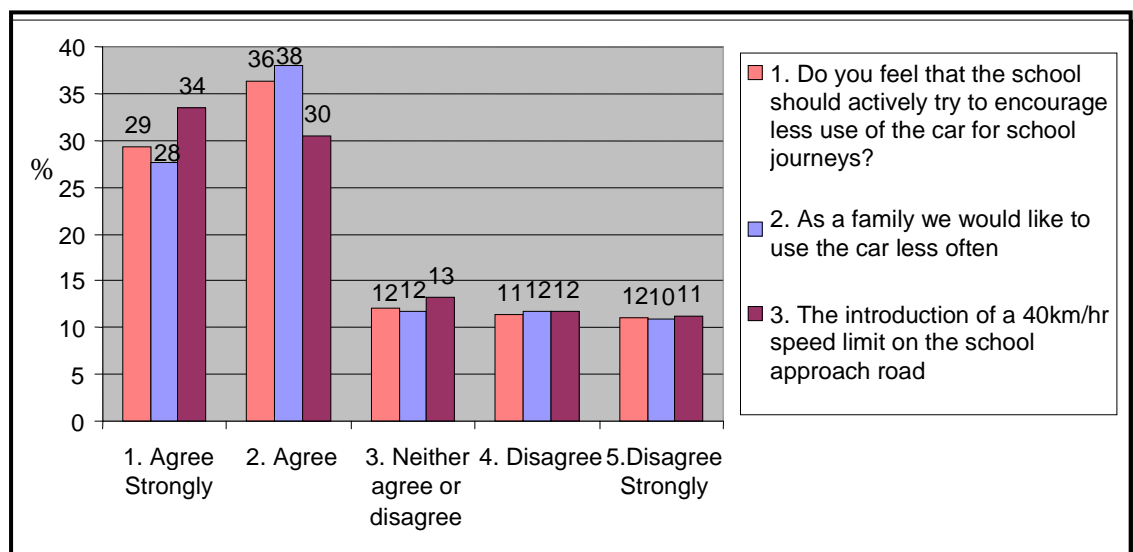


Figure 4.18: Comments by Car Users

Figure 4.18 shows that the majority of respondents (65%) agreed that the schools should actively try to encourage less use of the car for school journeys. From a family point of view, 66% agreed that as a family they would like to use the car less often. In keeping with the on-site observations 64% agreed that a 40km/hr speed limit should be introduced on the approach roads of schools.

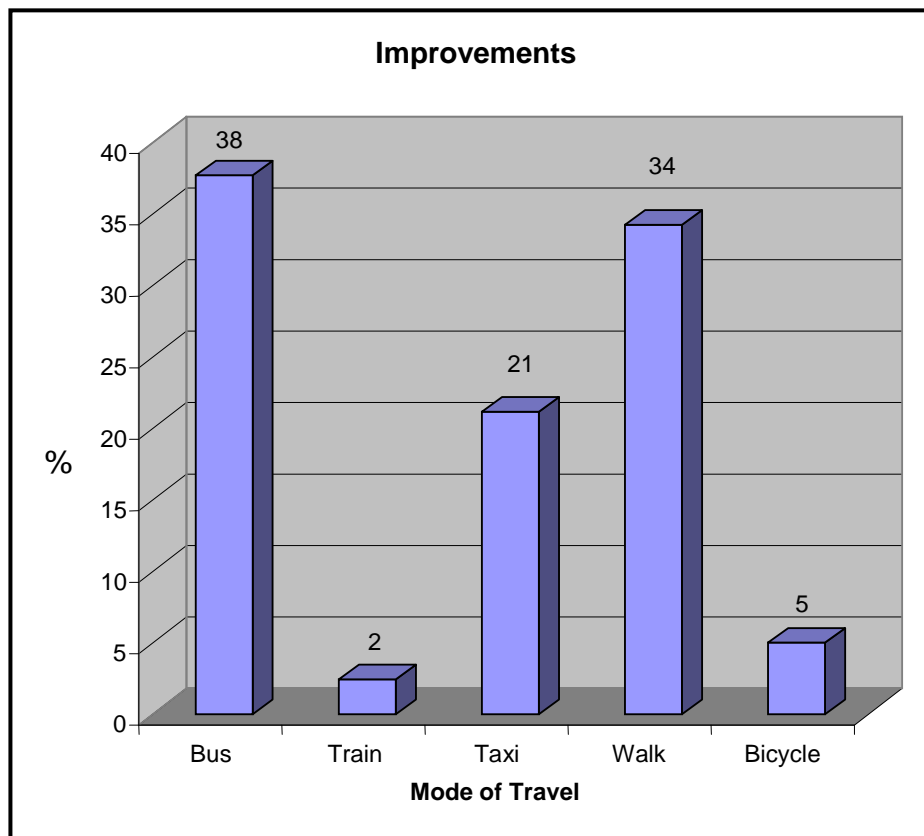


Figure 4.19: Likelihood of Car Users using other means of Transport with Improvements

If improvements were made to other modes of transport, the largest group of the car users would opt to travel by bus (38%). This is an interesting statistic which should be a source of encouragement to campaigns promoting public transport as a means to reduce the number of cars on the road and so lessen traffic congestion. A similarly high percentage of car users would be likely to walk (34%) if improvements were made to the walking environment on the way to school. The least likely mode of transport that car users would consider using is trains with a mere 2% opting for this mode.

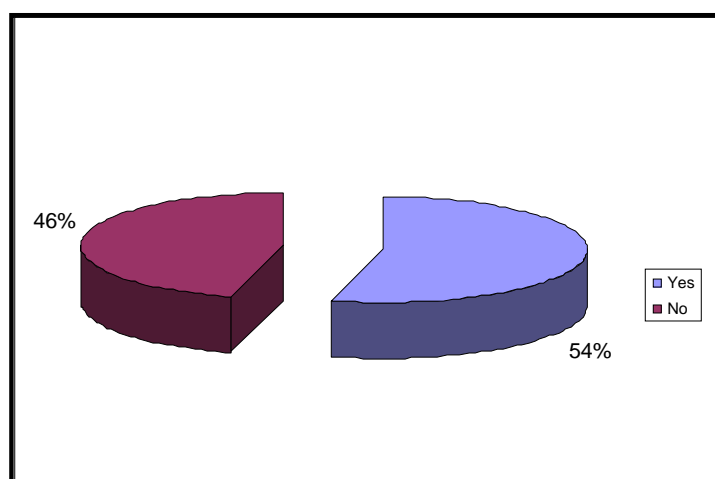


Figure 4.20: Would you be Interested in Using a Walking Bus Service?

The potential of a walking bus in which children are escorted as a group by trained and approved parents to school was targeted at car users. Collection could be from a convenient collection point such as a hall or car park. Figure 4.20 illustrates that 54% of the car users responded positively to the use of a “walking bus”. This project has the potential to reduce the congestion on roads during peak times thereby reducing the interaction between cars and pedestrians.

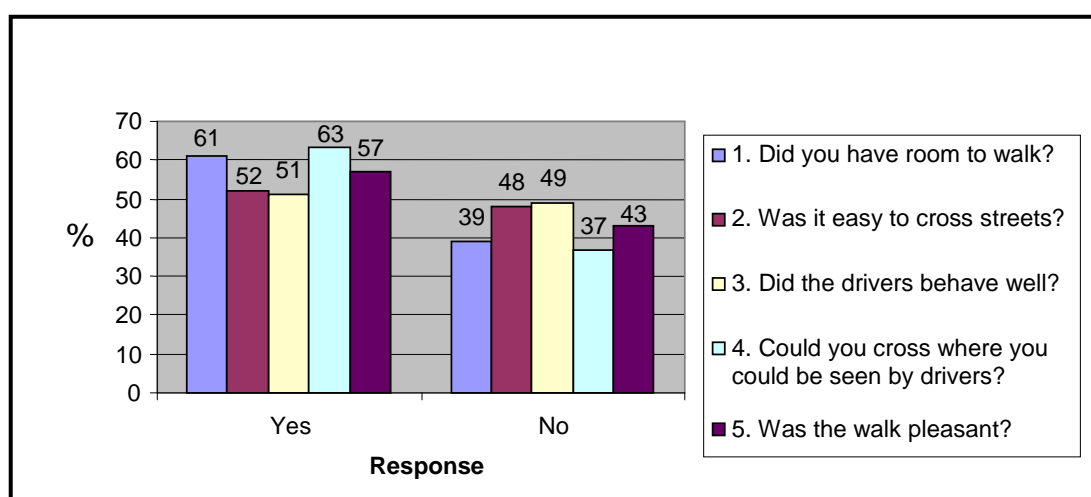


Figure 4.21: Problems Experienced by Pedestrians on Route to School

The study also investigated problems experienced by pedestrians on route to school. Figure 4.21 illustrates that 61% agreed that there was sufficient room to walk, while 48% complained that it was not easy to cross streets. On-site observation confirmed that the number of lanes together with the high volume of traffic makes it difficult for scholars to cross roads. Internationally and

locally a pedestrian crossing gives pedestrians right of way. It was evident from the survey and on-site observation that drivers did not adhere to this law and therefore a high percentage of respondents felt that drivers did not behave well (49%). On-site observations confirm that visibility was not a problem. However 37% of respondents felt that they could not cross where they could be seen by the drivers.

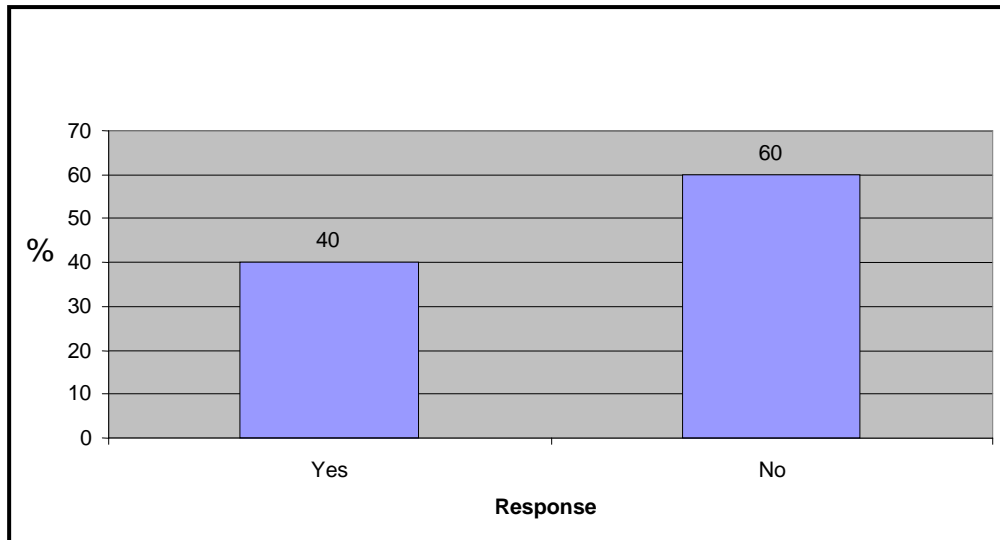


Figure 4.22: Do you have a Coupon?

Figure 4.22 reflects the percentage response of respondents that make use of coupons for school travel. Coupons offer scholars a reduced rate for using public transport. Only 40% of respondents used this incentive. The other 60% may either be unaware of this incentive or the capital outlay for the monthly pass makes this option unviable for the poor.

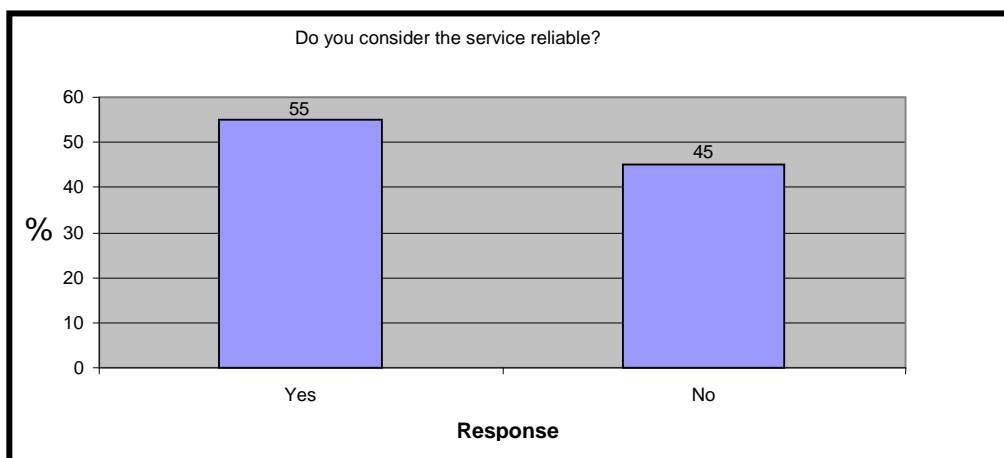


Figure 4.23: Service Reliability

Figure 4.23 shows that on average 55% of respondents found the service reliable while 45% found the bus, train and taxi service unreliable.

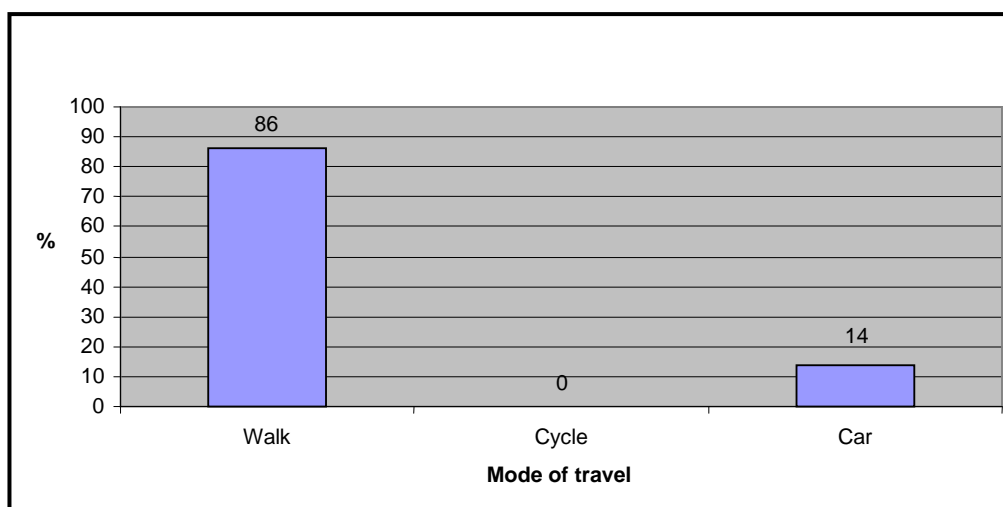


Figure 4.24: How do you get to the Bus/Taxi/Train stop?

Figure 4.24 above shows that 86% of respondents walk to the bus, train or taxi services while 14% use a car to reach their stops.

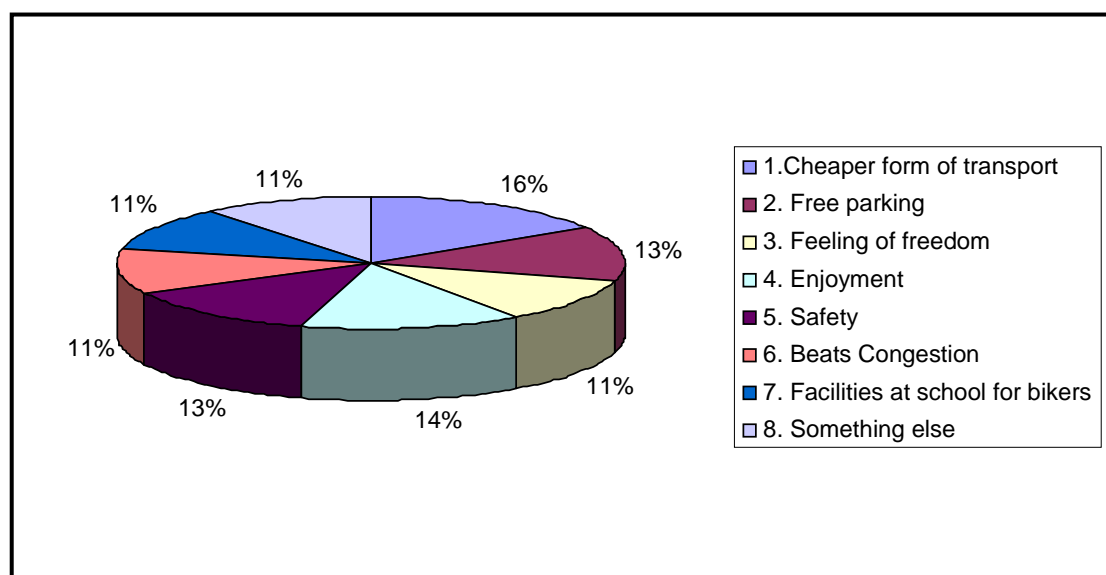


Figure 4.25: What is your Motivation for Cycling to School?

The analysis above (Figure 4.25) was targeted at cyclists. The purpose of this was to ascertain the motivation for cycling to school. The main motivation for cycling to school was that it was a cheaper form of transport (16%), followed by enjoyment (14%). These were followed by free parking and safety which accounted for 13% each.

A few open ended questions were asked and the feedback is summarised below:

‘What is the main factor that determines the route you take to school?’

A few of the students did not respond to the above question. It was found that for many of the respondents safety was not an issue and the shortest distance was the main factor that determined the route to school. These respondents commented that they had limited time to get to school so the shortest route was the most attractive factor. Only a few indicated that safety was the main factor. For many of the respondents traffic was a problem while others preferred to come to school by some motorised means but due to lack of finances they were forced to walk to school. For many this decision was made by their parents.

‘What improvements would you make to improve the safety to get to school?’

Responses to this question varied as follows :-

- more signage;
- installation of robots/stop streets;
- upgrade or installation of speed humps;
- bus shelters;
- pointspersons to assist cross roads safely;
- Specific school buses.

From all the responses above, specific school buses was the most common. This mode of travel is discussed under item 2.4.5 and is considered to be the safest form of transportation.

‘What are some of the problems that you experience when getting to school?’

Responses to this question varied from road safety matters to matters of security. In terms of non road safety matters, criminals, hijackings, rape and harassment (especially for female scholars) were some of the problems that respondents faced.

Driver behaviour especially amongst the taxi drivers was found to be the most common problem. This is in keeping with the discussion under item 2.3.6 of the literature review. It was felt that this industry hindered road safety and harsher enforcement was necessary. In keeping with driver behaviour it was also found that fast and reckless driving is a problem. Some of the respondents felt that the timings of the robots did not allow them sufficient time to cross the roads.

‘What do you personally find the most difficult thing about making the journey to or from school?’

For the above question crossing of the street seemed to be the greatest difficulty for the respondents. Other responses varied from cleanliness of the buses, high cost of bus fare to long travelling distances to get to school. On a lighter note many complained about having to get up early.

Bus, train and taxi users were asked:

‘What problems (if any) have you experienced at the stops/stations when boarding and leaving?’

Here many of the respondents complained about long queues and pushing in the queues. Some complained about the lack of shelters at the stops/stations. Once again many respondents complained about the bad attitude of the taxi drivers. A few respondents complained that the service was generally late.

‘What problems have you experienced while on the bus/train/taxi?’

Many of the respondents complained about the high noise levels on the bus, train or taxi. Some were irritated by the pushing. Many complained that drivers were generally rude and some were drunk and this made the respondents feel very unsafe. Many complained of overcrowding especially in the mornings when children and adults are integrated. A few complained that they did not get change from the conductors.

4.3 Site Assessment

On-site assessments were conducted as part of the research. This included condition and geometrics of the roads, signage, traffic calming, entrance facilities at schools and audit of a formal travel plan. This assessment sheet is included as Appendix C.

The following are some of the positive observations:-

- There was no evidence of potholes;
- The geometrics of the roads in terms of sight distances, alignments, bell mounts and terrain are of a high standard for motorisation.

The assessment confirmed the following:-

- Some of the schools speed limits were considered undesirable;
- None of the schools had bicycle racks;
- None of the schools had a formal school travel plan;
- None of the schools had a " parking forbidden" sign in front of the school;
- Maintenance in terms of paint markings and signage was lacking;
- Facilities for cyclists are non existent;
- In many instances school involvement was non-existent. In some cases school officials and community members were involved to a limited extent to assist scholars and traffic within the school. In a few instances security personnel assisted with traffic within the school in the absence of school officials;
- Although the majority of the schools have a pointsperson, this was lacking in other schools. The pointsperson was either a caretaker, security personnel or a member of the community who is generally retired. The absence of scholars involved in this task was noted;
- In a few instances, drivers did not obey the pointsperson;
- In many instances parents are forced to load and unload children on the main thoroughfare while in other instances parents found this more convenient although a proper area elsewhere was designated for this function;
- Fairly wide roads together with speed limits in excess of 40km/hr

and driver behaviour make it difficult for scholars to cross roads;

- Non-motorised zones were non-existent. These zones have been restricted to speed management environments in terms of Table 2.3;
- An absence of a structured travel plan has been observed;
- Traffic calming measures have been restricted to lowering speed limits, rumble strips, speed humps and limited signage. This is not to the level discussed in our literature review under Item 2.5.1.
- Scholars often made incorrect choices when they crossed streets;
- Grassed shoulders often forced scholars to walk on the roadway because of the wet grass or uncut vegetation;
- In many instances cars were parked on the verge and scholars were forced onto the roadway.

Table 4.2 below shows the short comings for each school.

Table 4.2: Specific Short Comings from Focal Survey

Coedmore Primary	Speed limit considered too high. Difficult crossing location. Signage was limited.
Sodelani	Speed limit considered inadequate. Dense vegetation along sidewalks. Signage was limited. Absence of rumble strips and speed humps. No pointsperson or security guard.
Bhekisasa	Speed limit considered inadequate. No pedestrian crossing. Signage was limited. No speed humps or rumble strips. No pointsperson.
Siphosethu P	Unpaved kerbs. Absence of school officials. No pointsperson.
Ohlange	Speed limit considered inadequate. Difficult to cross the street. No speed humps or rumble strips. No pointsperson.
Langalibalela SP	Speed limit considered inadequate. Difficult crossing because of traffic. No speed humps or rumble strips. Absence of school officials.
Ohlange	Speed limit considered inadequate. Difficult to cross the street. Limited signage. No rumble strips and speed humps. No scholar patrol or pointsperson.
Al Falaah	Absence of a one way. No pedestrian crossing. Limited evidence of a travel plan.
Springfield	Speed limit considered inadequate. Trucks obscure visibility. Corner of Alpine and Umgeni is a difficult crossing because of traffic and the angle of the intersection.
Umlazi Compensation School	Speed limit considered inadequate. Difficult crossing because of traffic.

CHAPTER 5 : CONCLUSIONS AND RECOMMENDATIONS

A holistic approach to road safety encompasses Engineering, Education, Enforcement and Encouragement.

The findings of the questionnaire surveys clearly show that as economic conditions improve pedestrians are most likely to travel to school by car. The site investigation also indicates that there is lack of home zones, pedestrianisations and clear zones. Lack of space and the high level of car ownership have clearly forced municipalities and road designers to design for the drivers with limited thought for the pedestrians.

A considerable investment will have to be made in rail transport to attract scholars to use this mode. The rail network is closely linked to the bus or taxi transport and it seems that at this stage the investment should rather be directed to the bus industry. The investment in the bus industry and a move towards specific school buses as observed internationally will be a cost effective solution from a safety and traffic congestion point of view. There is enormous scope to make this service more efficient and safer.

Driver behaviour especially amongst the taxis further hinders scholars from walking to school and this can only be eradicated with effective driver education and traffic laws enforcement.

The specific recommendation for each school is listed in Table 5.1 below:

Table 5.1: Specific Recommendations from Focal Survey

Coedmore Primary	Increase signage.
Sodelani	Reduce the speed limit. Clean vegetation along sidewalks. Increase signage. Installation of rumble strips and speed humps. Appoint pointsperson or security guard.
Bhekisasa	Reduce the speed limit. Installation of a pedestrian crossing. Increase signage. Installation of rumble strips and speed humps. Appoint pointsperson.
Siphosethu P	Pave kerbs. Allocate school officials to assist scholars. Appoint pointsperson.
Ohlange	Provided incentives to get community members to assist scholars to cross the street. Install speed humps or rumble strips. Appoint pointsperson.
Langalibalela SP	Reduce speed limit. Provided incentives to get community members to assist scholars to cross the street. Install speed humps or rumble strips. Appoint school officials to assist scholars.
Ohlange	Reduce speed limit. Provided incentives to get community members to assist scholars to cross the street. Install additional signage. Install rumble strips or speed humps. Appoint scholar patrol or pointsperson.
Al Falaah	Convert the approach road to a one way for specific times in the mornings and afternoons. Install a pedestrian crossing. Appoint a pointsperson.
Springfield	Installation of rumble strips to reduce speed. Proper enforcement to ensure that trucks do not obscure visibility. Additional personnel to assist children to cross the streets. An overhead walkway crossing Alpine Road is recommended.
Umlazi Compensation School	A traffic signal at the entrance of Umlazi Comtech is highly recommended considering the volume of traffic on the Mungosuthu Highway. Reduce the speed limit. An overhead walkway is recommended.

5.1 Role of the Community and School Involvement

Schools need to play a more active role in reducing accidents by formulating a travel plan. A travel plan is a holistic approach to transport management. Such a plan aims to reduce the impact of travel at a particular site. Measures

introduced by such plans vary but include actions which encourage walking, cycling, use of public transport and car sharing.

The Road Traffic Act (Act 93 of 1996) section 57.5 (Republic of South Africa, 1996) states that scholars can be organised into patrols so that the safety of pedestrian crossings on public streets or roads can be ensured. The Department of Transport has piloted many projects in this regard but these projects need to be sustained.

Parents and educators should be encouraged to assist by volunteering their assistance with projects such as “walking bus” and “walk to school” projects and “junior traffic warden” schemes. Retired members of the community or volunteers within the community could assist by helping children to cross the road.

Traffic congestion could be reduced if schools staggered the times for entering and exiting the school as per the different grades.

Road safety training should begin with practical training preferably at the roadside involving educators, scholars, parents and the community. This education could be enhanced using the latest technology.

The appointment of a road safety co-ordinator in each school who is also a member of the road safety committee would assist with the implementation of appropriate programmes.

5.2 Municipalities, Government and NGOs

Stricter laws and aggressive enforcement and adjudication of reasonable speed limits need to be implemented. The present incentive scheme by the Durban Metropolitan Police Service whereby speeders can have all fines issued before 31 December 2004 withdrawn and all outstanding fines issued after 1 January 2005 be reduced by 50% further creates a culture of non-payment and indirectly supports drivers that speed. It is the researcher's opinion that zero tolerance for speeders should be exercised.

A more supportive traffic environment for school travel can be achieved by introducing a minimum level of signage and traffic calming measures for school zones e.g. the introduction of a 40km/hr speed limit on school approach roads and the formulation of a traffic safety plan for school zones.

Communities, schools, researchers, municipalities, NGOs and government should be encouraged to work together to build a safe South Africa and to co-ordinate their efforts.

Educational events such as workshops and road shows to raise public awareness on speeding and driving safely should be organised.

International successes include initiatives from municipalities to challenge every school in the country to come forward with their own ideas for implementing initiatives to reduce car use on school journeys. Winning entrants receive technical advice and assistance in developing their ideas.

5.3 Engineers and Town planners

The haphazard way in which town planning was historically carried out has contributed to the location of schools along major roads. This results in intense pedestrian activity adjacent to some sections of the national road network. Although this has the advantage of access to public transport the location of schools on streets adjacent to major roads would be better and have numerous safety advantages. The positioning of schools along major roads can be overcome by stricter town planning legislation and codes of practice, appropriate education of planners and, ultimately, stricter enforcement.

At present traffic calming and signage is installed long after construction. School zones need to be established with minimum traffic calming, speed limits and signage in place even before any new construction or extension of any school is undertaken.

In addition, it appears that increased traffic flows deter parents from allowing their children to walk or cycle to school.

On-site investigations confirm the need for installing traffic calming measures around all schools to increase pedestrian and cyclist safety. Safe routes for walking and cycling also need to be established. Facilities to safely store bicycles and wet clothing during periods of wet weather are needed.

As pedestrian safety receives more attention, the development of these and similar data collection techniques will assist transport officials in assessing and improving the safety of the walking environment near schools.

Ideally the introduction of non-motorised zones is the solution to making the road environment conducive to pedestrians. This concept is non-existent and therefore restricted motorisation should be seen as the short term solution.

There is an opportunity to make travel to school in the eThekweni Municipality both safer and healthier. A closer liaison between Government, Municipalities teachers, students, parents and the community would result in more efficient services. The introduction of travel plans would allow schools to work in conjunction with local authorities and should be the primary focus. Travel plans would effect the change from knowledge based educational programmes to a more behavioural based approach.

Table 5.2: Summarised Version of Key Actions Together with the Challenges

Key Area	Challenge	Key Action
Journey to School.	Implementation of travel plans.	<ul style="list-style-type: none"> • Discuss willingness of schools, communities and municipalities to work together to implement meaningful travel plans.
Public Transport.	Improve public transport services and information.	<ul style="list-style-type: none"> • Passenger transport information be made available on websites. • Introduce additional routes for school children (driven by travel plans). • Improve customer satisfaction in terms of reliability and cleanliness. • Subsidy of this service by government to reduce traffic volumes. • Improve facilities at bus stops in terms of safety and shelters. • Marketing drive to ensure safety. <p>Buses</p> <ul style="list-style-type: none"> • Introduce specific school buses as per international counterparts. • Redesign of buses to allow for young users.

Key Area	Challenge	Key Action
		<p>Trains</p> <ul style="list-style-type: none"> • Nodal transfer. • Considerable investment needs to be made to promote this mode as a safe mode of transport
Poor Siting Of Schools / Legalities.	Proper legislations to ensure that schools are not sited on major roads.	<ul style="list-style-type: none"> • Legislations and codes of practice to be revised. • Education of Planners, Engineers and Town Planners to design for pedestrian centred roads as opposed to driver centred roads thereby creating more non-motorised zones. • Practical legislation that sets out the minimum requirements for school zones to be implemented for any new schools and if existing schools are considering any extensions.
Driver Behaviour.	Zero tolerance for bad drivers.	<ul style="list-style-type: none"> • Effective enforcement. • A re-look at the driver testing method. • Merit and demerit system.
Creating Non Motorised Zones / School Zones.	Improve safety.	<ul style="list-style-type: none"> • Education of Town Planners and Engineers. • Legislations for enforcement of non-motorised zones. <p>Factors that Could Encourage Cycling and Walking</p> <ul style="list-style-type: none"> • Pave grassed shoulders. • Speed management in terms of road design and traffic calming with adequate signage, road marking and speed reduction measures to be installed and maintained. • To identify safe routes to school from travel plans. • Facilities at school to store bicycles. <p>Assistance for younger scholars to make the crossing of roads easy.</p> <ul style="list-style-type: none"> • Community Involvement • School officials can assist • Municipalities can provide personnel to assist the scholars.
Management – Better Coordination and Cooperation Between all Stakeholders.	All stakeholders to report to one responsible authority.	<ul style="list-style-type: none"> • A travel plan in essence will force a coordinated effort between the school, engineers, enforcement officers, communities, municipalities, Department of Transport and Department of Education
Enforcement.	Good legislations and practices can only be achieved with the proper enforcement.	<ul style="list-style-type: none"> • Effective enforcement. • Review operational planning methods to ensure that hazardous locations are prioritised. • Merit and demerit system.

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QUESTIONNAIRE: TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN: CONFIDENTIAL

The information obtained from this questionnaire is confidential. No one will be identified. If you have any concerns or questions please contact Salma Dhoda on 2042889 or 0722563907. Questionnaires may be completed with the help of parents.

Kindly tick the appropriate boxes. eg. ☐

SECTION A (COMPULSORY)

TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN

Record No.

(for office use)

Full Name:

Name of School:

Where do you live? Street Name _____ **Suburb** _____

1.0 DEMOGRAPHICS

1.1 Gender:

☐ Male ☐ Female

1.2 What grade are you in?

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ 11 ☐ 12

1.3 What is your age?(years)

☐ <8 ☐ 8-12 ☐ 13-17 ☐ >18

2.0 TIME, DISTANCE, COST

2.1 How long does it currently take you to get to school?(mins)

☐ less than 15 ☐ 15-29 ☐ 30-59
☐ more than 60

2.2 How far do you live from school? (km)

☐ less than 5 ☐ 5-10 ☐ 11-15 ☐ 16-20 ☐ more than 20

2.3 What percentage of your parent/s income get used towards **school travel?**

☐ less than 5% ☐ 6-10% ☐ >11%

2.4 What percentage of your parent/s income gets used towards **travel?** (school, work, entertainment, etc) (Parent may assist)

☐ less than 5% ☐ 6-10% ☐ 11-20 ☐ >21%

3.0 CAR/BICYCLE OWNERSHIP

3.1 How many members are there in your household? (including yourself)

☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ >4

QUESTIONNAIRE: TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN: CONFIDENTIAL

3.2 How many cars are there in your household?

- ☐ None ☐ 1 ☐ 2 ☐ >2

3.3 Do you own a bicycle?

- ☐ Yes ☐ No

3.3.1. If yes, how many bicycles are there in your household?

- ☐ 1 ☐ 2 ☐ 3 ☐ >3

4.0 MODE OF TRAVEL

4.1 What is your main mode of travel to school?

- | | |
|-------------------------------------------------------------------------------------------|-------------------------|
| <input type="checkbox"/> Car | Please answer section B |
| <input type="checkbox"/> Walk | Please answer section C |
| <input type="checkbox"/> Bus <input type="checkbox"/> Train <input type="checkbox"/> Taxi | Please answer section D |
| <input type="checkbox"/> Bicycle | Please answer section E |

4.2 Which of the following do you sometimes use instead of the main mode of travel?

- | | |
|-------------------------------------------------------------------------------------------|-------------------------|
| <input type="checkbox"/> Car | Please answer section B |
| <input type="checkbox"/> Walk | Please answer section C |
| <input type="checkbox"/> Bus <input type="checkbox"/> Train <input type="checkbox"/> Taxi | Please answer section D |
| <input type="checkbox"/> Bicycle | Please answer section E |

4.3 If you had a completely free choice, how would you travel to and from school?

- ☐ Car
☐ Walk
☐ Bus ☐ Train ☐ Taxi
☐ Bicycle

4.4 Which is the most important improvement?

4.4.1 What improvement to the **bus, train and taxi transport** would make you more likely to use it? (tick one only)

- ☐ Better Connections
☐ Faster service
☐ Cheaper fares
☐ More direct service
☐ Cleaner facilities
☐ Better reliability
☐ Specific school buses / trains /taxi
☐ Safety
☐ None

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☐ Other (please specify) _____

4.4.2 What improvements to the **cycling** facilities would make you more likely to cycle to school? (tick one only)

- ☐ Changing facilities at school
- ☐ Arrangements to buy a bicycle at a discount
- ☐ Secure cycle parking
- ☐ Better road facilities eg: cycle tracks
- ☐ None
- ☐ Other (please specify) _____

4.4.3 What improvements to pedestrian facilities would make you more likely to **walk to school**? (tick one only)

- ☐ More footpaths around your home
- ☐ More footpaths on the journey to school
- ☐ Better road crossing facilities
- ☐ More scholar patrol and increased security
- ☐ None
- ☐ Other (please specify) _____

4.5 Which of the following would most encourage you household to **car share**/lift clubs/car pools? (tick one only)

- ☐ Help in finding car share partners
- ☐ Standby arrangements
- ☐ Reserved parking for car sharers
- ☐ None
- ☐ Other (please specify) _____

5.0 GENERAL COMMENTS

5.1 Do you think that the speed limit at the vicinity of the school is adequate?

☐ Yes ☐ No

5.2 Are speed humps/bumps near schools adequate?

☐ Yes ☐ No

5.3 Are facilities adequate for dropping off and picking up students?

☐ Yes ☐ No

5.4 Do you think that there is a traffic problem around school?

☐ Yes ☐ No

5.5 What is the main factor that determines the route you take to school?

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5.6 What improvements would you make to improve the safety to get to school?

5.7 Can you specify some unsafe locations?
☐ Yes ☐ No Specify if yes

5.8 What are some of the problems that you experience when getting to school?

5.9.1 What do you personally find the most difficult thing about making the journey to or from school?

5.10 Have you ever had an accident or near miss during your school travel.
☐ Yes ☐ No

5.10.1 If "yes" describe what happened.

5.11 Have you **witnessed** an accident or near miss during your school travel.
☐ Yes ☐ No

5.11.1 If "yes" describe what happened.

"Thank you for completing Section 1 of the questionnaire, kindly refer to questions 4.1 and 4.2 above to see the sections that you are required to complete the questionnaire."

SECTION B

Cars

1. How many other people (incl driver) are in the car?
☐ One
☐ Two
☐ Three
☐ >Three
2. How many of the above are pupils(including yourself)?
☐ One
☐ Two
☐ Three
☐ > Three
3. With whom do you normally travel to school?
☐ By yourself
☐ Parent/Guardian
☐ Brother/sister
☐ School friend
☐ Parent of another students
Other (please specify) _____
4. Is this journey?
☐ A special journey just to drop you off/ pick up from school
☐ As part of another journey that must be done eg. work
☐ As part of a multiple school run ie: dropping off children at other schools
☐ As part of another journey eg. going shopping
☐ Some other reason
5. Do you feel that the school should actively try to encourage less use of the car for school journeys?
☐ Agree Strongly ☐ Agree ☐ Neither agree not disagree ☐ Disagree
☐ Disagree Strongly
6. As a family we would like to use the car less often.
☐ Agree Strongly ☐ Agree ☐ Neither agree not disagree ☐ Disagree
☐ Disagree Strongly
7. The introduction of a 40km/hr speed limit on the school approach road.

QUESTIONNAIRE: TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN: CONFIDENTIAL

☐ Agree Strongly ☐ Agree ☐ Neither agree nor disagree ☐ Disagree

☐ Disagree Strongly

8. If improvements were made to allow you to travel to school other than by car, which of the following would you be prepared to use regularly?

☐ Bus ☐ Train ☐ Taxi ☐ Walk ☐ Bicycle

9. Some schools are considering the possibility of a “walking bus” in which children are escorted as a group by trained and approved parents to school. Collection could be from your home or even from a convenient collection point such as a hall or car park. Would you be interested to use such a service?

☐ Yes ☐ No

10. Any other comments you consider to be of relevance or importance.

SECTION C

Pedestrians

- 1 = awful
2 = quite a few problems
3 = some problems
4 = good
5 = very good
6 = excellent

1. Did you have room to walk?

Rating 1 2 3 4 5 6

☐ Yes ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Sidewalks started and stopped
☐ Sidewalks were broken or cracked
☐ Sidewalks were blocked with poles, signs, shrubbery, dumpsters etc
☐ No sidewalks, paths or shoulders
☐ Too much traffic
☐ Something else. Please specify _____

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Location of problem

2. Was it easy to cross streets?

Rating 1 2 3 4 5 6

- ☐ Yes ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Road was too wide
☐ Traffic signals made us wait too long or did not give us enough time to cross
☐ Needed striped crosswalks or traffic signals
☐ Parked cars blocked our view of travel
☐ Trees or plants blocked our view of travel
☐ Needed curb ramps or ramps needed repair
☐ Something else. Please specify _____

Location of problem

3. Did drivers behave well?

Rating 1 2 3 4 5 6

- ☐ Yes ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Backed out of driveways without looking
☐ Did not yield to people crossing the street
☐ Speed up to make it through traffic lights or drove through red lights
☐ Something else. Please specify _____

Location of problem

4. Was it easy to follow safety rules?

Rating 1 2 3 4 5 6

Could you

Cross at crosswalks or where you could see and be seen by drivers?

- ☐ Yes ☐ No

Walk on sidewalks or shoulders facing traffic where there were no sidewalks?

- ☐ Yes ☐ No

Cross with the light

- ☐ Yes ☐ No

Location of problem

5. Was your walk pleasant?

Rating 1 2 3 4 5 6

- ☐ Yes ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

QUESTIONNAIRE: TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN: CONFIDENTIAL

- ☐ Need more grass flowers or trees
- ☐ Scary dogs
- ☐ Poor Lighting
- ☐ Dirty, lots of litter or trash
- ☐ Something else? Please specify _____

Location of problem

SECTION D

Bus, Trains and Taxis

1. Which mode of travel do you use to school?

- ☐ Bus ☐ Train ☐ Taxi

If you travel by bus which of the following do you use?

- ☐ School Bus
☐ Public Bus
☐ Not applicable

2. What problems (if any) have you experienced at the stops when boarding and/or leaving?

3. What problems have you experienced while on the bus/train/taxi?

4. Do you have a coupon?

- ☐ Yes ☐ No

5. Do you consider the service to be reliable?

- ☐ Yes ☐ No

6. Are loading areas located in such a place as to minimize students exposure to traffic and other hazardous elements?

- ☐ Yes ☐ No

SECTION E

Bicycle

1. What is your motivation for cycling to school?

- ☐ Cheaper form of transport
- ☐ Free parking
- ☐ Feeling of freedom
- ☐ Enjoyment
- ☐ Safety
- ☐ Beats congestion
- ☐ Facilities at school for bikers
- ☐ Something else?

2. When not using the bicycle for commuting, what mode of transport would you usually use?

- ☐ Car
- ☐ Walk
- ☐ Bus Train Taxi
- ☐ Bicycle

3. What are some of the problems that you experience while cycling to school.

"Your assistance in completing this questionnaire is appreciated."

To All Parents / Guardians / Students / Educators

Hi

TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN.

Various departments including the Department of Education and the Department of Transport are actively looking for ways to improve conditions for children traveling to and from school.

In most instances the number of school children being driven to school has increased over the years. This has increased the number of cars in and around the school at particular times. Besides causing congestion there is an increased risk of accidents as the conflict between cars and pedestrians increases.

In other instances, although the number of driven children have not increased considerably the environment and/or infrastructure does not make it safe for children to walk or cycle to school.

In order to collect the necessary information, a questionnaire has been produced which school children and/or parents are requested to complete. The completed questionnaire should be returned within three days.

It is important that all questionnaires are returned to establish a good understanding of the current travel pattern and your preferences. All responses will be strictly confidential.

The enclosed questionnaire is divided into Sections A, B, C, D and E. Section A is compulsory whereas sections B-F is depended on your answers to 4.1 and 4.2 of the questionnaire.

The results of this survey will be disseminated via conferences, publications, workshops and the final thesis to the various authorities.

I thank you for your time and co-operation in this survey.

Yours faithfully

Salma Dhoda
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0722563907

QUESTIONNAIRE: TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN: CONFIDENTIAL

The information obtained from this questionnaire is confidential. No one will be identified. If you have any concerns or questions please contact Salma Dhoda on 2042889 or 0722563907. Questionnaires may be completed with the help of parents/educators/researcher.

Kindly tick the appropriate boxes. eg. ☐

SECTION A (COMPULSORY)

*This section is compulsory. Kindly answer **ALL** the questions honestly.*

TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN

Record No.

(for office use)

Full Name:

Name of School:

Where do you live? Street Name _____ **Suburb** _____

1.0 DEMOGRAPHICS

1.1 Gender:

i) ☐ Male ii) ☐ Female

1.2 What grade are you in?

☐1 ☐2 ☐3 ☐4 ☐5 ☐6 ☐7 ☐8 ☐9 ☐10 ☐11 ☐12

1.3 What is your age?(years)

☐ <8 ☐ 8-12 ☐ 13-17 ☐ >18

2.0 TIME, DISTANCE, COST

2.1 How long does it currently take you to get to school?(mins)

☐ less than 15 ☐ 15-29 ☐ 30-60
☐ more than 60

2.2 How far do you live from school? (km)

☐ less than 2 ☐ 2-3 ☐ 3.1-5 ☐ 5.1-10 ☐ more than 10

2.3 What percentage of your parent/s income get used towards **school travel?** (Please ask parents to assist)

☐ less than 5% ☐ 5-10% ☐ more than 10%

2.4 What percentage of your parent/s income gets used towards **travel?** (school, work, entertainment, etc) (Parent may assist)

☐ less than 5% ☐ 5-10% ☐ 11-20% ☐ more than 20%

3.0 CAR/BICYCLE OWNERSHIP

3.1 How many members are there in your household? (including yourself)
☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ >4

3.2 How many cars are there in your household / at home?
☐ None ☐ 1 ☐ 2 ☐ >2

3.3 Do you own a bicycle?
☐ Yes ☐ No

3.3.1. If yes, how many bicycles are there in your household including yours?
☐ 1 ☐ 2 ☐ 3 ☐ >3

4.0 MODE OF TRAVEL

4.1 What is your main mode of travel to school?
☐ Car Please answer section B
☐ Walk Please answer section C
☐ Bus Please answer section D
☐ Train Please answer section D
☐ Taxi Please answer section D
☐ Bicycle Please answer section E

4.2 Which of the following do you sometimes use instead of the main mode of travel?
☐ Car Please answer section B
☐ Walk Please answer section C
☐ Bus Please answer section D
☐ Train Please answer section D
☐ Taxi Please answer section D
☐ Bicycle Please answer section E

4.3 If you had a completely free choice, how would you travel to and from school?
☐ Car
☐ Walk
☐ Bus
☐ Train
☐ Taxi
☐ Bicycle

4.4 Possible Improvement

4.4.1 What improvement to the **bus, train and taxi transport** would make you more likely to use it? (tick one only)

- ☐ Better Connections
- ☐ Faster service
- ☐ Cheaper fares
- ☐ More direct service
- ☐ Better reliability
- ☐ Specific school buses / trains /taxi
- ☐ Safety
- ☐ None
- ☐ Other (please specify) _____

4.4.2 What improvements to the **cycling** facilities would make you more likely to cycle to school? (tick one only)

- ☐ Changing facilities at school
- ☐ Arrangements to buy a bicycle at a discount
- ☐ Secure cycle parking
- ☐ Better road facilities eg: cycle tracks
- ☐ None
- ☐ Other (please specify) _____

4.4.3 What improvements to pedestrian facilities would make you more likely to **walk to school**? (tick one only)

- ☐ More footpaths around your home
- ☐ More footpaths on the journey to school
- ☐ Better road crossing facilities
- ☐ More scholar patrol and increased security
- ☐ None
- ☐ Other (please specify) _____

4.5 Which of the following would most encourage your household to **car share**/lift clubs/car pools? (tick one only)

- ☐ Help in finding car share partners
- ☐ Standby arrangements
- ☐ Reserved drop off bays for car sharers
- ☐ None
- ☐ Other (please specify) _____

5.0 GENERAL COMMENTS

5.1 Do you think that the speed limit at the vicinity of the school is adequate?
☐ Yes ☐ No

5.2 Are speed humps/bumps near schools adequate?
☐ Yes ☐ No

5.3 Are facilities adequate for dropping off and picking up students?
☐ Yes ☐ No

5.4 Do you think that there is a traffic problem around school?
☐ Yes ☐ No

5.5 What is the main factor that determines the route you take to school?

5.6 What improvements would you make to improve the safety to get to school?

5.7 Can you specify some unsafe locations?
☐ Yes ☐ No Specify if yes

5.8 What are some of the problems that you experience when getting to school?

5.9 What do you personally find the most difficult thing about making the journey to or from school?

5.10 Have you ever had an accident or near miss during your school travel.
☐ Yes ☐ No

5.10.1 If "yes" describe what happened.

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5.11 Have you **witnessed** an accident or near miss during your school travel.

- ☐ Yes ☐ No

5.11.1 If “yes” describe what happened.

5.12 Do you come to school in an open light delivery vehicle(LDV) ie. bakkie

- ☐ Yes ☐ No

“Thank you for completing Section 1 of the questionnaire, kindly refer to questions 4.1 and 4.2 above to see the sections that you are required to complete the questionnaire.”

SECTION B

Car Users

*Complete this section if you usually travel by CAR to school
Kindly answer **ALL** the questions truthfully.*

1. How many other people (incl driver) are in the car?

- ☐ One
☐ Two
☐ Three
☐ >Three

2. How many of the above are pupils(including yourself)?

- ☐ One
☐ Two
☐ Three
☐ > Three

3. With whom do you normally travel to school?

- ☐ By yourself
☐ Parent/Guardian
☐ Brother/sister
☐ School friend
☐ Parent of another students
☐ Some other reason (please specify) _____

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4. Is this journey?

- ☐ A special journey just to drop you off/ pick up from school
☐ As part of another journey that must be done eg. work
☐ As part of a multiple school run ie: dropping off children at other schools
☐ As part of another journey eg. going shopping
☐ Some other reason (please specify) _____

5. Do you feel that the school should actively try to encourage less use of the car for school journeys?

- ☐ Yes ☐ No

6. As a family we would like to use the car less often.

- ☐ Yes ☐ No

7. The introduction of a 40km/hr speed limit on the school approach road.

- ☐ Yes ☐ No

8. If improvements were made to allow you to travel to school other than by car, which of the following would you be prepared to use regularly?

- ☐ Bus ☐ Train ☐ Taxi ☐ Walk ☐ Bicycle

9. Some schools are considering the possibility of a "walking bus" in which children are escorted as a group by trained and approved parents to school. Collection could be from your home or even from a convenient collection point such as a hall or car park. Would you be interested to use such a service?

- ☐ Yes ☐ No

10. Any other comments you consider to be of relevance or importance. _____

SECTION C Pedestrians

*Complete this section if you usually WALK to school
Kindly answer ALL the questions truthfully.*

1. Did you have room to walk?

- ☐ Yes ☐ No (tick the relevant problems - see below)

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*Tick below if you answered **NO** to the above question*

- ☐ Sidewalks were broken or cracked
- ☐ Sidewalks were blocked with poles, signs, litter etc
- ☐ No sidewalks, paths or shoulders
- ☐ Too much traffic
- ☐ Something else. Please specify _____

2. Was it easy to cross streets?

- ☐ Yes
- ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Road was too wide
- ☐ Traffic signals made us wait too long or did not give us enough time to cross
- ☐ Needed striped crosswalks or traffic signals
- ☐ Parked cars blocked our view of travel
- ☐ Trees or plants blocked our view of travel
- ☐ Something else. Please specify _____

3. Did drivers behave well?

- ☐ Yes
- ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Backed out of driveways without looking
- ☐ Did not yield to people crossing the street
- ☐ Speed up to make it through traffic lights or drove through red lights
- ☐ Something else. Please specify _____

4. Was is easy to follow safety rules?

Could you

Cross at crosswalks or where you could see and be seen by drivers?

- ☐ Yes
- ☐ No

Walk on sidewalks or shoulders facing traffic where there were no sidewalks?

- ☐ Yes
- ☐ No

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Cross with the light

☐ Yes ☐ No

5. Was your walk pleasant?

☐ Yes ☐ No (tick the relevant problems - see below)

*Tick below if you answered **NO** to the above question*

- ☐ Need more grass, flowers or trees
- ☐ Scary dogs
- ☐ Poor visibility
- ☐ Dirty, lots of litter or trash
- ☐ Something else? Please specify _____

SECTION D

Bus, Trains and Taxis

*Complete this section if you usually travel by BUS, TRAIN or TAXI to school
Kindly answer **ALL** the questions truthfully.*

1. Which mode of travel do you use to school?

☐ Bus ☐ Train ☐ Taxi

If you travel by bus which of the following do you use?

- ☐ School Bus
- ☐ Public Bus
- ☐ Not applicable

2. What problems (if any) have you experienced at the stops/station when boarding and/or leaving?

3. What problems have you experienced while on the bus/train/taxi?

4. Do you have a coupon?

☐ Yes ☐ No

5. Do you consider the service to be reliable?

☐ Yes ☐ No

6. Are loading areas located in such a place as to minimize students exposure

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to traffic and other hazardous elements?

☐ Yes ☐ No

7. How do you get to the bus/train/taxi stop

☐ Walk ☐ Cycle ☐ Car ☐ Other _____ (please specify)

SECTION E

Bicycle

*Complete this section if you usually CYCLE to school
Kindly answer **ALL** the questions truthfully.*

1. What is your motivation for cycling to school?

- ☐ Cheaper form of transport
- ☐ Free parking
- ☐ Feeling of freedom
- ☐ Enjoyment
- ☐ Safety
- ☐ Beats congestion
- ☐ Facilities at school for bikers
- ☐ Something else?

2. What are some of the problems that you experience while cycling to school.

"Your assistance in completing this questionnaire is appreciated."

EXISTING FACILITIES CHECKLIST:

NAME OF SCHOOL:

LOCATION:

Type of school?

☐ Private ☐ Model C ☐ Government ☐ Other (Please specify _____)

Level of school?

☐ Primary ☐ Secondary ☐ Both ☐ Other (Please specify _____)

Total number of students in school _____

1.0	PATH OF TRAVEL Provincial / Local Road	YES	NO	LOCATION
1.1	Is the speed limit adequate?			n/a
1.2	Is the path of travel stable, firm and slip resistant?			n/a
1.3	Is the path of travel at least 500mm wide?			n/a
1.4	Is the slope steep? (Visual)			n/a
1.5	Are there any sections along the path with missing sidewalks?			
1.6	Are there any pot holes?			
1.7	Is there adequate visibility for obstructions at corners?			
1.8	Are sidewalks blocked by bushes or tree branches or other obstacles?			
1.9	Are there any difficult crossing locations?			

2.0	SIGNAGE	YES	NO
	Are the following signage visible?		
2.1	Adequate indication to drivers that a school is present in the vicinity.		
2.2	Pedestrians signage		
2.3	Reduction in speed.		
2.4	Stop sign		
2.5	Forbidden parking in front of school.		
2.6	Traffic signals		

3.0	TRAFFIC CALMING Are the following present at the vicinity of the school?	YES	NO
3.1	Rumble strip		
3.2	Speed Hump		
3.3	Pedestrian Crossing		
3.4	One way roads		
3.5	lower speed limits		
3.6	Other		

4.0	ENTRANCE FACILITIES NEAR OR AT SCHOOL	YES	NO
4.1	Is a scholar patrol appointed? Is a points person appointed? (lollipop man)		
4.2	Is there a separate pedestrian and vehicular entrance?		
4.3	Separate bus and vehicle facilities		
4.4	Is the visitor's parking clearly visible?		

5.0	OTHER FACILITIES AT SCHOOL	YES	NO
5.1	Is there parking facilities for cars?		
5.2	Are bicycle racks available?		
5.3	Are parents forced to load and unload children on the main thoroughfare?		
5.4	Is there a designated area for parents to pick up children eg. student loading bays		
5.5	Are kerbing with suitable drainage / pavements available?		
5.6	Do students have to cross parking lots, driveway entrances, exits, and designated loading zones to get to their classrooms or the school office?		
5.7	Other		

6.0	STUDENT PICKUP/DROP OF PLAN	YES	NO
6.1	Are the school officials involved?		
6.2	To what extent?		
6.3	Are the parents involved?		
6.4	To what extent.		

TRAVEL PATTERNS AND SAFETY OF SCHOOL CHILDREN IN THE eTHEKWINI MUNICIPALITY

DHODA, S. AND ALLOPI, D.*

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ABSTRACT

Approximately 34 000 pedestrian casualties occur annually on South African Roads. This includes approximately 4000 deaths, 10 000 serious injuries and 20 000 minor injuries, costing the country an estimated R2,55 billion. Child casualties are particularly distressing and preventing them is no easy challenge. The 2003 statistics for the eThekweni Municipality reflects that 38% of all children, in the 0-16 age group, injured in accidents were occupants of either minibuses or LDVs. This could indicate unsafe modes of scholar transport. Furthermore the vulnerability of a child pedestrian is highlighted by the fact that 23% of all pedestrians' casualties were children and 1318 of 1957 children killed were pedestrians (67%).

Statistics confirms that pedestrians are most at risk. School children have been recognized as forming a significant percentage of the pedestrians. It is thus important to understand factors that influence children's travel patterns as an initial step to reduce the accident rate. This paper examines children's travel patterns at primary and secondary schools level in the eThekweni area.

In the absence of statistics regarding education trip-making, a questionnaire survey has been undertaken to determine demographics, mode of travel to school, travel cost and duration, factors influencing alternate modes of travel and problems experienced during school travel in terms of road safety. An on site investigation was carried out to assess engineering aspects inclusive of geometric design, traffic calming, signage and other traffic management aspects. This paper focuses on scholar transport and will discuss the findings of the pilot survey and site investigations.

1. INTRODUCTION

Accidents in the eThekweni Municipality during 2003 cost on average an estimated R6 million per day inclusive of hidden cost such as trauma, grief, suffering and inconvenience (eThekweni Transport Authority, 2003). During 1996 a total of 605 children in the age group 0-18 years were killed and 5509 were injured non fatally in traffic collisions involving pedestrians in South Africa (Venter, 2000). Pedestrians in accidents stand a 93% chance of sustaining injuries, while drivers in accidents stand a 5% chance (eThekweni Municipality,

2000). Clearly, the importance of road safety and road safety research cannot be overemphasized.

Figure 1a illustrates that pedestrians make up 60% of deaths while Figure 1b reflects that pedestrian casualties constitute 39% in the eThekweni Municipality. Pedestrian casualties in Gauteng, Western Cape, Eastern Cape and KwaZulu Natal are above the national average. According to the Arrive Alive website, 25% of pedestrian fatalities are children aged 16 years or less (<http://www.arrivealive.co.za/pages.asp?mc=info&nc=statspart4>) [Accessed 20 January 2005]. It is thus important to understand factors that influence children's travel patterns as an initial step to reduce the accident rate.

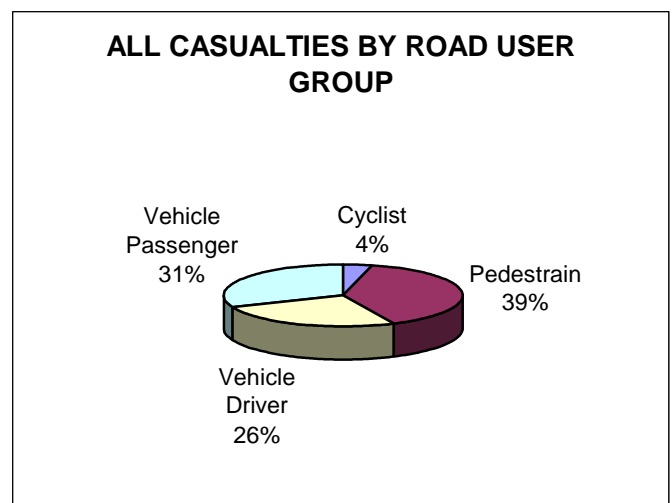
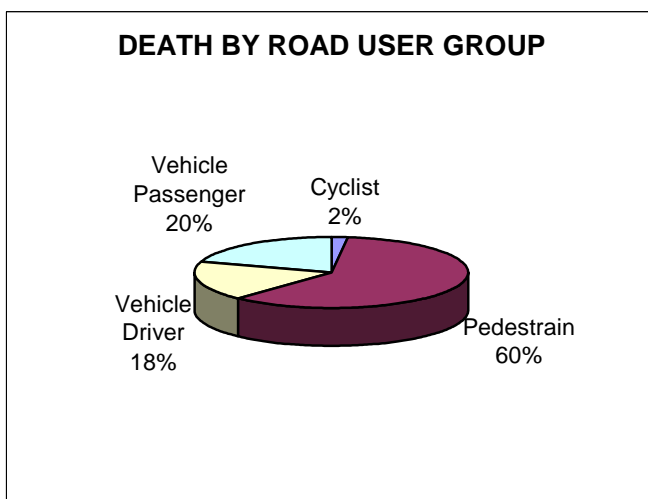


Figure 1a: Death by road user Group

Figure 1b: Casualties by road user group

Source: eThekweni Municipality 2000

1.1 Public Transport and Pedestrians

Safety is not only a problem for public transport passengers in vehicles but also for pedestrians walking along public roads. South Africa has a disturbingly high pedestrian accident record. Many of these pedestrians are public transport users walking to or from bus and taxi stops.

In recent years, bus operators have experienced a significant decline in patronage. This is most probably attributed to the increase in the use of the minibus taxis. National policies aim to improve existing road networks, relieve congestion and encourage the use of public transport. It states, for example, that 80% of commuter trips should be by public transport and that patrons should not have to spend more than 10% of their disposable household income on public transport (Department of Transport, 1996).

In the Durban Metropolitan area, 57% of commuter trips are currently by public transport. However, this varies considerably in different locations with some areas having public

transport usage as high as 94% and others practically none at all (Traffic and Transportation Department, 1995).

1.2 Bicycle use

The author's observation indicates that existing road traffic conditions, infrastructure and terrain in the eThekweni Municipality make it unsafe to ride a bicycle. It is thus not surprising that the level of cycling in the Durban area is low. Yet, the bicycle is one of the most cost efficient mode of transport. Advantages include a benefit to the environment and the people who use bicycles. It is also of interest to note that bicycle sales worldwide are three times as high as that of motor vehicles. Although this research will not be a comprehensive study for the potential of bicycle transport, the study will investigate the potential of bicycle transport to be integrated into the school travel plan.

1.3 Car Ownership

This is closely linked to household income and impacts significantly on the requirements for public transport. In the greater Durban area car ownership is 190 cars per 1000 people. Generally high-income areas showed levels in excess of 400 cars per 1000 people. Lower income areas had levels of less than 100 cars per 1000 population with rural areas tending to be the lowest having only 20 cars per 1000 population. Low-income areas rely heavily on public transport whereas high-income areas would generally make use of private vehicles even though a reasonable public transport system may or may not be available. It is important to reduce the dependency on private transport as this will reduce traffic congestion and the need for investment in capital-intensive road structure (Traffic and Transportation Department, 1995). Traffic congestion leads to pollution, noise, unpleasant aesthetics, increased travel times, reduced pedestrian, bicycle safety and more especially reduced safety where children need to cross the road regularly. As congestion continues to grow, so does the number and frequency of accidents

2. WHY SCHOOL TRAVEL?

School travel is important for a number of reasons. School journeys usually take place at peak times and have the same destination every day. Regular journey patterns are often easier to target with road safety programmes or travel demand management strategies since large numbers of people travelling to the same place at the same time increase not only the efficiency with which safety programmes can be delivered but also the potential for shared services (Morris et al.,2002).

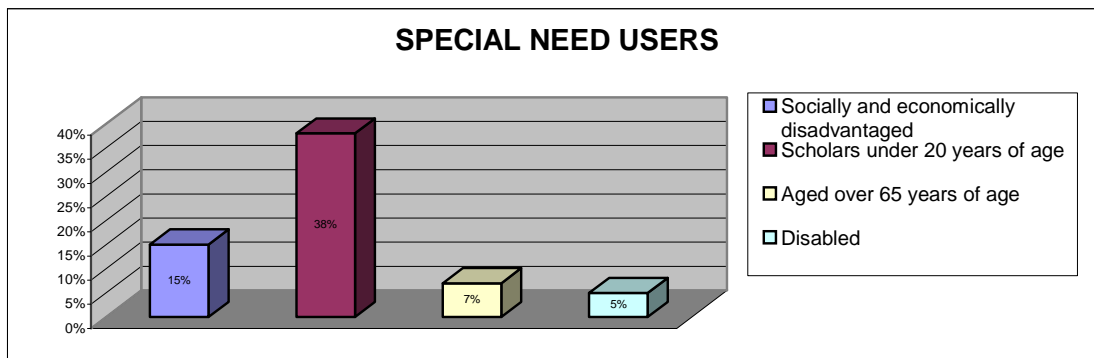


Figure 2: Special user Groups in the eThekweni area

From the 1996 Population Census special needs groups, divided into four categories for this study, accounted for 65% of the total population. Figure 2 illustrates that scholars make up the largest proportion of “special needs” users (38%). Recent surveys carried out as part of the Fundamental Restructuring Project, indicated that scholars accounted for some 20% of peak hour commuters (Traffic and Transportation Department, 2002).

Unfortunately, in many spheres “road safety” has become synonymous with education of children, and the perception of success or failure of past efforts depends entirely on presentation of statistical information. The limit placed on the role of education is given by Mac Gregor et al (1999) who suggests that children’s accidents arise not because of lack of knowledge, but because children make “mistakes”. As they argue, the answer to this cannot be better education, but to work towards a more forgiving traffic environment.

2.1 Safe Routes to Schools

Internationally safe route to schools is a community approach to:

- ❑ Encourage more people to walk and cycle to school safely.
- ❑ Improve road safety and reduce children casualty.
- ❑ Improve children’s health and development.
- ❑ Reduce traffic congestion and pollution.

3. SURVEY QUESTIONNAIRE

During June 2004, 500 questionnaires were handed to 5 schools for completion. These schools included:

Name of School	Location	Level	Type
Thandawazi Primary	KwaMashu	Senior Primary	Government
Isibonela Secondary	Kwa Mashu	Secondary	Government
Ferndale Combined School	Phoenix	Primary and secondary	Government
Christopher Nxumalo	Chesterville	Primary	Government
Umlazi Comtech	Umlazi	Secondary	Government

A response rate of 10% was preferred; however an absolute minimum of 8% response rate was accepted for analysis. 4 of the 5 schools satisfied this requirement and therefore Umlazi Comtech was excluded.

The questionnaire was specifically targeted at scholars to establish:

- ❑ Demographics
- ❑ Mode of travel to school
- ❑ Assessment of alternate modes of transport
- ❑ Origin, destination and route details.
- ❑ Travel cost and duration
- ❑ Factors influencing choice of school.
- ❑ Problems experienced on route to school in terms of road safety

3.1 Findings

The pilot survey was targeted at government schools in the north and south central areas of the eThekweni Municipality. The road accidents statistics were referenced to a map showing positions of schools. The respondents comprised 61% females and 39% males and varied from Grade 6 to Grade 11.

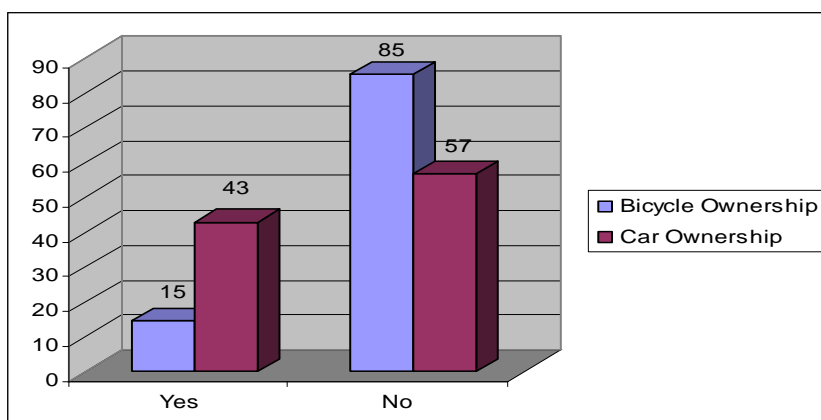


Figure 3: Car and bicycle ownership

Figure 3 illustrates that 15% of the households own a bicycle while 43% own a car. If this result was linked to socio economic factors, one would expect bicycle ownership to be greater.

It would appear that the economic, environmental and physical benefit of cycling has not been taken advantage of, because among other reasons the road infrastructure is not conducive to cycling.

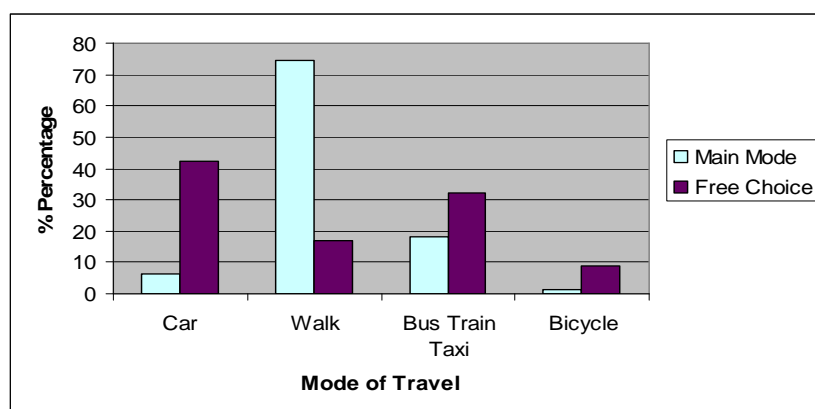


Figure 4: Main mode of travel to school and mode if given a free choice

Figure 4 above compares the present main mode of travel to school and the mode selection if scholars were given a free choice. Over 70% of the respondent's main mode of scholar travel is walking. If scholars were given a free choice then this percentage drops to under 20%. The pedestrian respondents attributed problems on route to school to driver behaviour, road crossing facilities and fatigue. Approximately 7% of the scholars' main mode of the travel to school is by car. This percentage increases to over 40% if scholars were given a free choice. The notion of convenience over environment, safety and fitness issues needs to be investigated for non motorized travel to be effective. It would appear that as socio economic conditions improve scholars, will prefer to travel by car as opposed to walking.

Table 1: Factors encouraging car share/ lift clubs (%)

Name of School	1.Help in finding car share partners	2.Standby Arrangements	3.Reserved parking for car shares	4.None	5.Other
Christopher Nxumalo	40	17	30	10	3
Ferndale	26	14	25	29	6
Isibonela	49	15	12	20	4
Thandawazi	24	22	21	19	14
Average	35	17	22	19	7

Table 1 illustrates the percentage response for each school when investigating the factors that will make scholars more likely to form lift clubs thereby reducing the vehicles on the road. It was established that 35% of the respondents will be more likely to car share if they received assistance in finding car share partners. Schools involvement in this regard will enhance the potential for lift clubs. 19% were not interested in lift clubs.

Table 2: Factors encouraging scholars to walk to school

	<i>1. More footpaths around your school</i>	<i>2. More footpaths on the journey to school</i>	<i>3. Better road crossing facilities</i>	<i>4. More scholar patrol and increased security</i>	<i>5. None</i>	<i>6. Other</i>
Christopher Nxumalo	15	20	25	33	5	2
Ferndale	5	21	40	22	9	3
Isibonela	23	10	58	7	2	0
Thandawazi	14	19	19	21	14	13
Average	14	17	36	21	8	4

Thandawazi and Isibonela are in close proximity to one another and a person from the community (points person) assist scholars to cross the road leading to the school. Table 2 illustrates that on average 36% felt that better road crossing facilities will encourage them to walk to school with Isibonela Secondary contributing to this high percentage (58%). One would have expected Thandawazi Senior Primary to display a higher concern to this factor than Isibonela High School considering the age difference. It was surprising that at Thandawazi, 21% of the scholars' main motivation to walk to school was for more scholar patrols and increased security. This could possibly be attributed to a security issue.

Table 3: Factors encouraging scholars to cycle to school

	<i>1. Changing Facilities at school</i>	<i>2. Arrangements to buy a bicycle at discount</i>	<i>3. Secure Cycle parking</i>	<i>4. Better roads Facilities e.g. Cycle Tracks</i>	<i>5. None</i>	<i>6. Other</i>
Christopher Nxumalo	11	18	28	21	18	4
Ferndale	12	9	26	23	24	6
Isibonela	23	10	58	7	2	0
Thandawazi	21	16	17	17	18	11
Average	17	13	32	17	16	5

While secure cycle parking was the main motivation for cycling to school, 16% of the respondents were not interested in cycling to school. It was expected that since bicycle ownership is low, economic factors such as “*arrangements to buy a bicycle at a discount*” will take preference but this was not the case with Table 3 reflecting that on average only 13% were motivated by this. In contrast, 32% of the respondents’ main motivation was secure cycle parking and this could be attributed to security concerns in the area. 58% of the scholars at Isibonela Secondary were concerned about the safety of the bicycles.

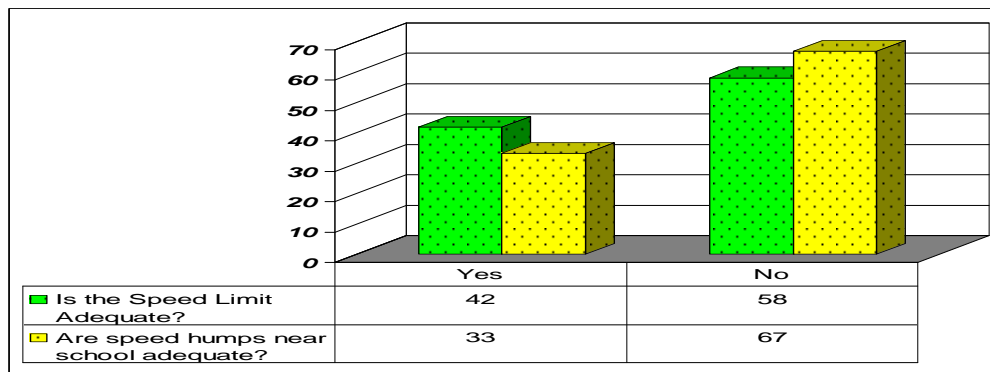


Figure 5: Adequacy of speed limit and speed humps

On site observation confirms the problems raised by the scholars in terms of speed limits and speed humps near the school. Figure 5 illustrates that 58% perceived the speed limit to be inappropriate while 67% were concerned that the speed humps near schools were not adequate.

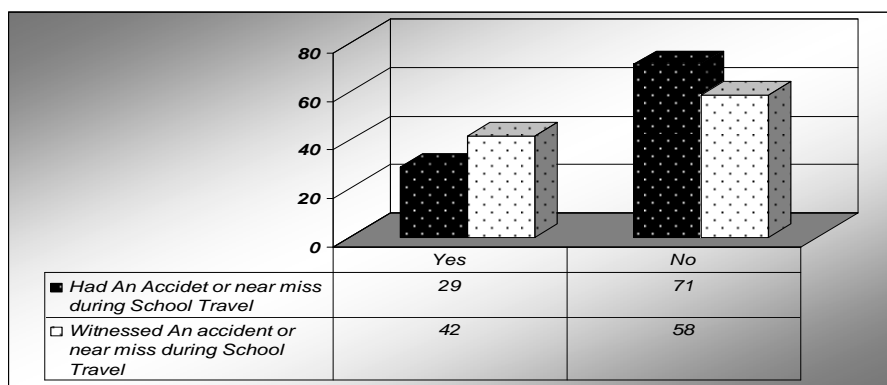


Figure 6: Accidents or near miss at schools

Figure 6 illustrates that 29% had an accident or near miss during school travel and 42% witnessed an accident or near miss during school travel. Respondents were asked to give details in order for the author to assess whether a near miss was road safety related.

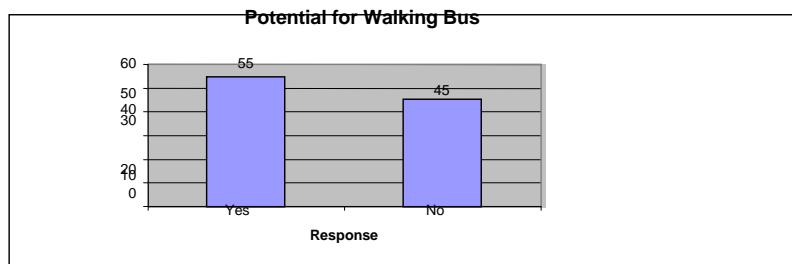


Figure 7: Potential for a walking bus

The potential of a walking bus in which children are escorted as a group by trained and approved parents to school was targeted at car users. Collection could be from a convenient collection point such as a hall or car park. Figure 7 illustrates that 55% of the car users responded positively to the use of a “walking bus”. This project has the potential to reduce the congestion on roads during peak times thereby reducing the interaction between cars and pedestrians.

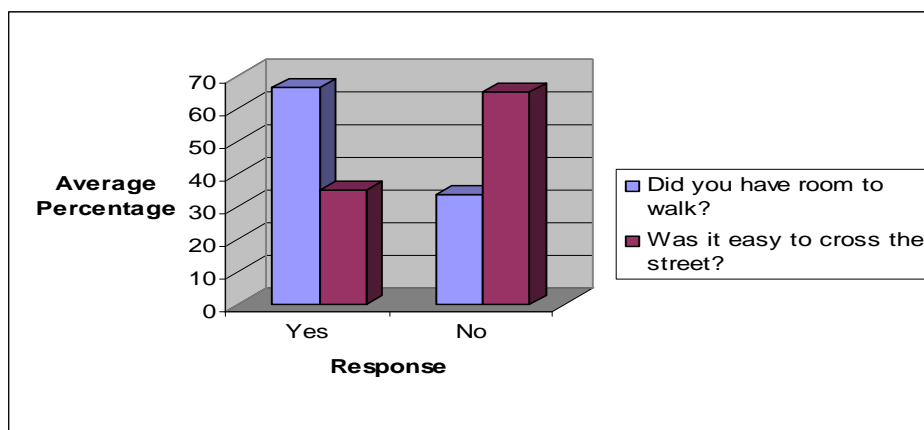


Figure 8: Problems experienced by pedestrians on route to school

The study also investigated problems experienced by pedestrians on route to school. Figure 8 illustrates that over 30% agreed that there was sufficient room to walk, however over 60% complained that it was not easy to cross streets. On site observation confirms that the number of lanes together with the high volume of traffic makes it difficult for the scholars to cross roads. Internationally and locally a pedestrian crossing gives pedestrians right of way. On site observations and the survey confirms that drivers did not adhere to this law and therefore a high percentage of the scholars felt that drivers did not behave well (69%).

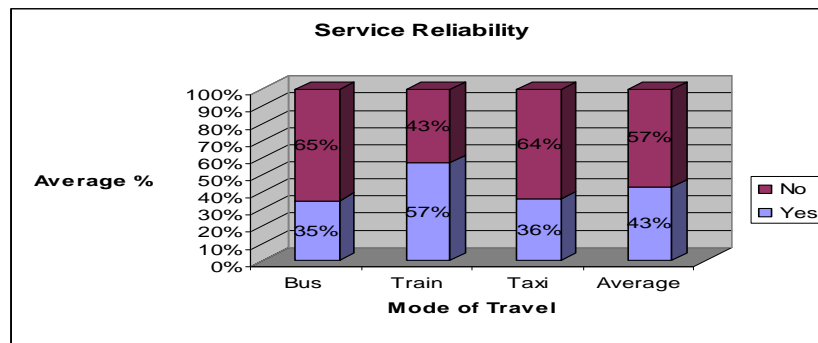


Figure 9: Service reliability

Figure 9 shows a comparative analysis of the service reliability for bus, train and taxi users. On average 57% of the respondents found the service unreliable. The majority (65%) of the bus users considered the service unreliable while 64% of the taxi users considered the service unreliable. According to the respondents, road based public transport is more unreliable. It would appear that as service reliability increases so too will the preference for travel mode change.

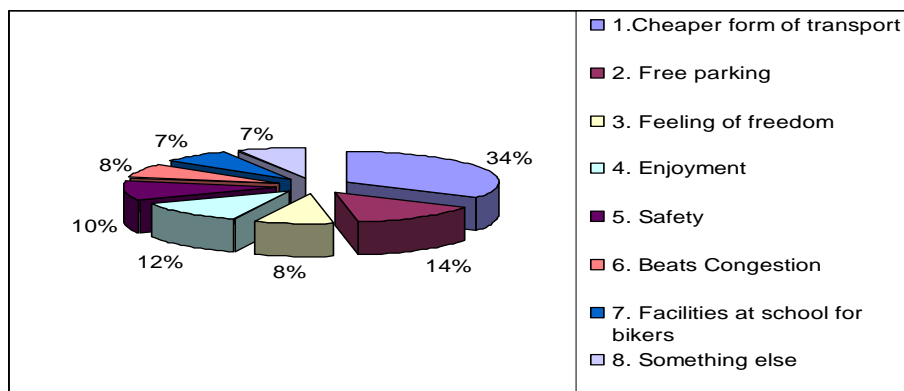


Figure 10: Motivations to cycle to school

The analysis above (Figure 10) was targeted at the cyclist. The purpose of this was to ascertain the motivation for cycling to school. The main motivation for cycling to school was that it was a cheaper form of transport (34%).

4. SITE ASSESSMENT

An on site assessment was conducted as part of the research. This included condition and geometrics of the road, signage, traffic calming, entrance facilities at school, formal travel plan.

The assessment confirmed the following:

- ❑ Speed limits in 4 of the 5 schools were considered undesirable
- ❑ Generally, signage included a school marking on the road and a pedestrian sign. Signage associated with traffic calming e.g. reduction in speed, speed humps etc were lacking.
- ❑ On site observations confirm that crossing the street was difficult. KwaMashu and Mangosuthu Highways were considered too wide. The speed limit of 60km/hr was generally not adhered to.
- ❑ None of the schools had any bicycle racks.
- ❑ None of the schools had a formal school travel plan.
- ❑ School officials were appointed in 3 of the 5 schools to assist learners crossing at the entrance of the school during mornings and afternoons.

5. CONCLUSION AND RECOMMENDATIONS

A holistic approach to road safety encompasses Engineering, Education, Enforcement and Encouragement.

5.1 Role of the Community and School Involvement

- ❑ Schools need to play a more active part to reduce accidents by formulating a travel plan.
- ❑ The Road Traffic Act (Act 93 of 1996) section 57.5 states that scholars can be organized into patrols so that the safety of pedestrian crossing on a public street or road can be ensured.
- ❑ Parents and educators should be encouraged to assist by volunteering their assistance with projects such as “walking bus” and “walk to school” projects.
- ❑ Road safety training should begin with practical training preferably at the roadside involving educators, parents and the community. This education could be enhanced using the latest technology.
- ❑ The appointment of a road safety co-ordinator in each school who is also a member of the road safety committee will assist with the implementation of appropriate programmes.
- ❑ Schools could assist parents in finding lift club partners.

5.2 Municipalities

- ❑ Stricter Laws and aggressive **enforcement** and adjudication of reasonable speed limits.
- ❑ A more forgiving traffic environment for school travel can be achieved by introducing signage and traffic calming measures for school zones e.g. the introduction of a

40km/hr speed limit on the school approach road. To formulate a traffic safety plan for school zones.

- ❑ Encouraging the communities, schools, researches, municipalities, NGO's and government to work together to build a safe South Africa and to coordinate the efforts of each.
- ❑ Organizing events (workshops, road shows) to raise public awareness on speeding and driving safely.
- ❑ A traffic signal at the entrance to Umlazi Comtech is highly recommended considering the volume of traffic on the Mangosuthu Highway.
- ❑ Internationally, authorities are using a number of different approaches to encourage schools to adopt travel plans. Some are targeting schools wishing to expand and requiring them to produce a travel plan in return for planning permission while others are targeting schools which have particular problems with congestion or parking. Similar approaches could be considered in South Africa.

This survey will be extended to incorporate schools of different classifications and age groups. A qualitative exploration of children's perspective of the road environment should be encouraged combined with observations of their road crossing behaviour outside schools recorded on video. Studies have shown that children sometimes misperceived the functions of engineering measures and interacted with them in ways that a designer may not have anticipated (Lupton et al, 2002). From a traffic congestion and road safety point of view, data regarding scholar travel is still very limited and more surveys of this nature need to be undertaken to reduce accidents.

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Presenters Certificate

This is to certify that

Salma Dhoda

Presented the following poster at the 8th World Conference on Injury Prevention and Safety Promotion held at the International Convention Centre, Durban, South Africa from 2 – 5 April 2006

“Towards an Effective Road Safety Initiative for School Children in the eThekweni Municipality, South Africa”

**Prof Mohamed Seedat
Conference Chairperson**

TOWARDS AN EFFECTIVE ROAD SAFETY INITIATIVE FOR SCHOOL CHILDREN IN THE ETHEKWINI MUNICIPALITY, SOUTH AFRICA

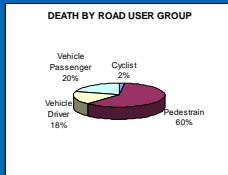


Figure 1: Death By Road User Group.
 Source: eThekweni Municipality 2000

Introduction

The 2003 statistics for the eThekweni Municipality reflects that 38% of all children, in the 0-16 age group, injured in accidents were occupants of either minibuses or LDVs. This could indicate unsafe modes of scholar transport.

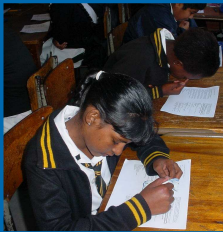
23% of all pedestrians' casualties were children and 1318 of 1957 children killed were pedestrians (67%).

Objectives

Obtain feedback from learners on their travel patterns, preferences and safety requirements.

Review existing policies, legislation and educational programmes as the basis for determining safe routes/access to schools.

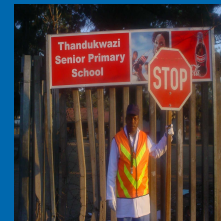
Assessment of engineering aspects pertaining to road safety in the vicinity of the school.



A questionnaire was designed to establish:
 Demographics, travel duration, distance, cost, mode of travel to school, assessment of alternate modes of transport, factors influencing choice of travel and problems experienced on route to school in terms of road safety

Methodology and findings

- Better road crossing facilities was the main factor to encourage scholars to walk to school (33%).
- Improvements to cycling did not appeal to 32% of the scholars.
- The pedestrians were of the opinion that drivers did not behave well with the majority feeling that drivers did not yield to scholars crossing the street (52%).



On site assessment was conducted and included condition and geometrics of the road, signage, traffic calming, entrance facilities at school, other facilities and formal travel plans

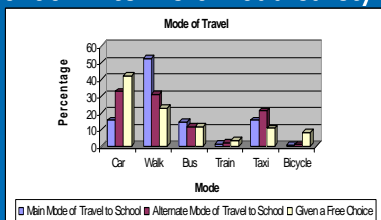


Figure 2: Mode of Travel

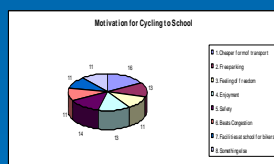


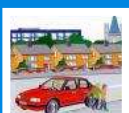
Figure 3: Motivation for Cycling

- None of the schools had a formal travel plan.
- Signage in some schools were either non-existent or not adequately maintained.
- Wide roads made it difficult for children to cross.
- Speed limits were considered undesirable in 40% of the schools.

Recommendations and conclusion

- Schools should be encouraged to adopt travel plans.
- A more forgiving traffic environment for school travel can be achieved by introducing signage and traffic calming measures for school zones e.g. the introduction of a 40km/hr speed limit on the school approach road.
- Stricter Laws and aggressive **enforcement** and adjudication of reasonable speed limits.

All role players need to play an active role in order to create a more forgiving road environment for our children.



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ANALYSIS OF THE PROBLEMS EXPERIENCED BY SCHOLARS DURING SCHOOL TRAVEL: A CASE STUDY

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ABSTRACT

Approximately 34 000 pedestrian casualties occur annually on South African roads. This includes approximately 4000 deaths, 10 000 serious injuries and 20 000 minor injuries, costing the country an estimated R2,55 billion.

Statistics indicate that pedestrians are most at risk. School children have been recognized as forming a considerable percentage of the pedestrians. It is thus important to understand factors that influence children's travel patterns as an initial step to reduce the accident rate. This paper examines children's travel patterns at primary and secondary schools level in the eThekweni area.

In the absence of statistics regarding education trip-making, a questionnaire survey has been established to determine demographics, mode of travel to school, travel cost and duration, factors influencing alternate mode of travel and problems experienced during school travel in terms of road safety. An on site investigation has been carried out for the assessment of engineering aspects inclusive of geometric design, traffic calming, signage and other traffic management aspects.

The findings of the pilot survey were presented at the 24th Southern African Transport Conference held in 2005. Some of the main findings highlights that the speed limit was not desirable, wide roads made it difficult for school children to cross and an absence of formal travel plans at schools.

This paper focuses on scholar transport and will discuss the findings of the main survey and site investigations.

1. INTRODUCTION

The 2003 statistics for the eThekweni Municipality reflects that 38% of all children, in the 0-16 age group, injured in accidents were occupants of either minibuses or LDVs. This could indicate unsafe modes of scholar transport. Furthermore the vulnerability of a child pedestrian

is highlighted by the fact that 23% of all pedestrians' casualties were children and 1318 of 1957 children killed were pedestrians (67%) (eThekweni Transport Authority, 2003).

Accidents involving children constitute 21% of pedestrian casualties, making them a high risk category (eThekweni Transport Authority, 2005). The challenge is to reduce the risk of injury but without keeping children from the experience of coping with traffic. Injuries to children are particularly distressing and preventing them is no easy challenge.

Transport is no longer a matter of laying out roads and constructing bridges; it is now a matter also relevant to public health, children's social development, social inclusion, urban vibrancy and environmental sustainability.

The travel mode of a large proportion of the population of South Africa is either by public transport or by foot. About 80% of all trips are by public transport and only 20% are in private vehicles (Ribbens, 1996).

However, the rapidly increasing level of car ownership and usage in South Africa is resulting in progressively more traffic congestion throughout the country. Limited organizations are examining ways of reducing traffic density as part of the broader transport policy. There are currently very limited statistics on travel patterns of scholars in South Africa.

Road safety has become synonymous with education of children and the perception of success or failure of past efforts depends entirely on presentation of statistical information. The limit placed on the role of education is given by Mac Gregor *et al* (1999) who suggests that children's accidents arise not because of lack of knowledge, but because children make "mistakes". As they argue, the answer to this cannot be better education, but to work towards a more forgiving traffic environment.

The objectives of this research includes:

- ✓ the examination of children's travel patterns at primary and secondary schools level.
- ✓ the assessment of the engineering aspects pertaining to road safety in the vicinity of the school.

The methodology includes:

- ✓ A questionnaire survey to determine demographics, mode of travel to school, travel cost and duration, factors influencing alternate mode of travel and problems experienced during school travel in terms of road safety.
- ✓ On site observation (checklist) for the assessment of engineering aspects inclusive of geometric design, traffic calming, signage etc.

Travel Plans

A travel plan is a package of measures aimed at reducing the impacts of travel to a particular site. The package should be drawn up in consultation with the regular users of that site to ensure that it meets the needs and that they have a sense of ownership of the travel plan. The measures introduced vary depending on the circumstances of individual sites but are likely to include measures to encourage cycling, walking, public transport use and car sharing.

Authorities are using a number of different approaches to encourage schools to adopt travel

plans. Some are targeting schools wishing to expand and requiring them to produce a travel plan in return for planning permission while others are targeting schools which have particular problems with congestion or parking outside (Bradshaw, 2001).

Travel plans offer a more holistic approach to transport management and have been widely adopted by schools and companies in the United Kingdom.

2. FINDINGS OF QUESTIONNAIRE SURVEY

During June 2004, a pilot survey was conducted of 500 pupils ranging from Grade 1 to Grade 12 to test the survey format and to make sure that the questions were clear. A few modifications were made to the original survey. A major problem was that the students seemed unsure of which sections they were required to answer as some sections of the questionnaire were specific to a particular mode of travel. The format was changed to include an instruction for each section. Few questions were ambiguous and these were either excluded or rephrased whilst a few pertinent questions were added. The schools in the pilot survey are reflected in Table 1 below:

Table 1. Schools in pilot survey

Name of School	Location	Level	Type
Thandawazi Primary	KwaMashu	Senior Primary	Government
Isibonela Secondary	Kwa Mashu	Secondary	Government
Ferndale Combined School	Phoenix	Primary and secondary	Government
Christopher Nxumalo	Chesterville	Primary	Government
Umlazi Comtech	Umlazi	Secondary	Government

A response rate of 10% was preferred; however an absolute minimum of 8% response rate was accepted for analysis. 4 of the 5 schools satisfied this requirement and therefore Umlazi Comtech was excluded. More questionnaires were handed to scholars at Umlazi Comtech and once the required response rate was achieved the findings were included in the main survey.

The survey has been limited to the following areas Umlazi, Chatsworth / Shallcross, Umgeni South, Phoenix, KwaMashu / Inanda, Ntuzuma and Durban CBD. These areas were based on the accident statistics and referenced on a map showing the positions of schools. The study area was also confirmed with eThekweni Municipality.

Once the questionnaire was revised the main survey was conducted amongst the schools listed in Table 2 below:

Table 2. Schools in main survey

Name of School	Location	Level	Type
Sondelani	Ntuzuma	Senior Primary	Government
Bhekisisa	Ntuzuma	Secondary	Government
Siphosethu P	Ntuzuma	Primary	Government
Langalibalela SP	Inanda	Senior Primary	Government
Ohlanga High School	Inanda	Secondary	Government
Springfield Primary School	Springfield	Primary	Government
Coedmore Primary	Chatsworth	Primary	Government
Grandmore Primary	Phoenix	Primary	Government
Allingham Primary	Phoenix	Primary	Government
Crossmead Primary	Chatsworth	Primary	Government
Crossmore Secondary	Chatsworth	Secondary	Government

Demographics

The survey was targeted at primary and secondary schools in the north and south central areas of the eThekweni Municipality

The survey was conducted amongst 60% females and 40% males, 35% in primary schools and 65% in secondary schools. More than 55% of the respondents have household sizes greater than 4 people while 43% do not own cars. A surprising 78% do not own bicycles.

How Children Travel to and from School?

There are a number of modes of transport that are available to school children to use to travel to school. The options include walking, car, bus, taxi, bicycle and rail.

Figure 1 below shows a comparative analysis of three questions posed to the respondents in terms of travel patterns. Walking is still the dominant mode of transport and constitutes 46% of all journeys, followed by taxi (21%), bus (12%), cars (19%), train (1%) and bicycle (1%).

When scholars were not using the main mode of transport then they sometimes had to use another mode of transport. Reasons for an alternate mode of transport could include weather conditions and availability of parents amongst others. Walking is still the dominant mode of transport but compared to the main mode, this percentage drops to 36%, followed by car (26%), taxi (21%), bus (15%), train (3%), and bicycle (2%).

If scholars were given a free choice, car is the preferred mode (42%). It will appear that as socio economic conditions increase, scholars will more likely use cars and this will lead to congestion.

The author's observation indicates that existing road traffic conditions, infrastructure and terrain in the eThekweni Municipality make it unsafe to ride a bicycle. It is thus not surprising that the level of cycling is low. Yet, the bicycle is one of the most cost efficient mode of transport. Advantages include a benefit to the environment and the people who use bicycles. It is also of interest to note that bicycle sales worldwide are three times as high as that of motor vehicles. Although this research will not be a comprehensive study for the potential of bicycle transport, the study will investigate the potential of bicycle transport to be integrated into the school travel plan.

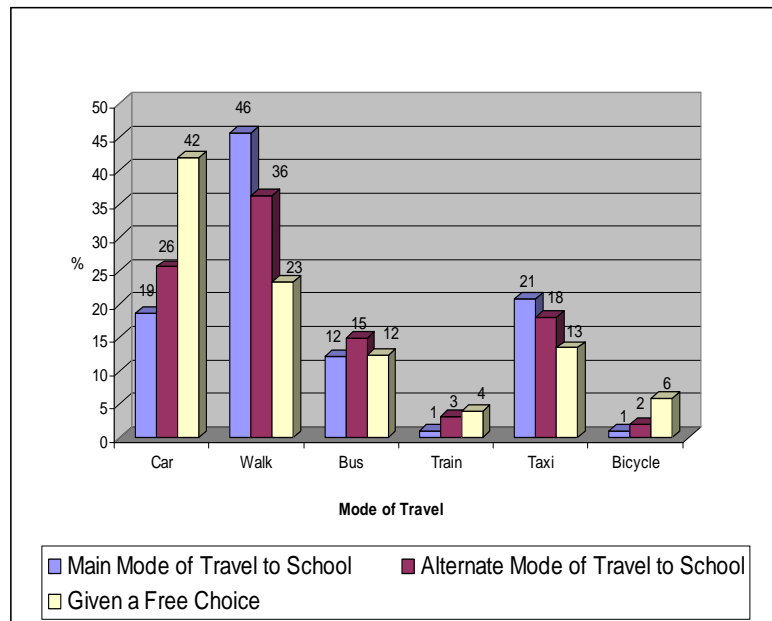


Figure 1. Mode of travel to school

Table 3 below highlights that cheaper fares (22%) and reliability (19%) are the most importance motivation for scholars to use the public transport and taxis. It appears that economic factors are given priority over safety (12%).

Table 3. Factors encouraging the use of bus, train and taxi

What improvement to the bus, train and taxi transport would make you more likely to use it?											
	1	2	3	4	5	6	7	8	9	10	Totals
Average (%)	5	12	22	6	6	19	13	12	3	2	100

- 1 = Better connections
- 2 = Faster service
- 3 = Cheaper fares
- 4 = More direct service
- 5 = Cleaner facilities
- 6 = Better reliability
- 7 = Specific school buses
- 8 = Safety
- 9 = None
- 10= Other

Table 4 indicates that over a quarter of the scholars (26%) are not interested in cycling. A further 26% will be encouraged to cycle if road facilities were better. On site observations confirms that presently the road infrastructure discourages cycling. Cycle lanes around schools are non existent.

Table 4. Factors encouraging cycling

What improvement to the cycling facilities would make you more likely to cycle to school							
	1.Changing facilities at school	2.Arrangements to buy a bicycle at discount	3.Secure cycle parking	4.Better roads facilities eg cycle tracks	5.None	6.Other	Totals
Average (%)	12	15	14	26	26	7	100

Table 5 illustrates that 28% of the scholars' main motivation to walk to school was for more scholar patrols and increased security. This could possibly be attributed to a security issue.

Site observations showed that many schools appoint a point's person who is generally a retired member of the community. Surprisingly none of the schools used scholars for this function. In one school (Springfield Primary) the absence of a points person results in the Head of departments having to undertake this task.

On average 26% felt that better road crossing facilities will encourage them to walk to school.

Table 5. Factors encouraging walking

	1.More footpaths around your school	2.More footpaths on the journey to school	3.Better road crossing facilities	4.More scholar patrol and increased security	5.None	6.Other	Totals
Average (%)	10	17	26	28	13	6	100

Table 6 below illustrates the percentage response for factors that will make scholars more likely to form lift clubs thereby reducing the vehicles on the road. It was established that 35% of the respondents will be more likely to car share if they received assistance in finding car share partners. Schools involvement in this regard will enhance the potential for lift clubs. 27% are not interested in lift clubs.

Table 6. Factors encouraging lift club

Which of the following would most encourage you or your household to car share/lift clubs/car pools?						
	1.Help in finding car share partners	2.Standby arrangements	3.Reserved parking for car shares	4.None	5.Other	Totals
Average	35	15	17	27	6	100

What about the safety of scholars?

Schools situated along major provincial roads make it difficult for the desired speed limits of 40km/hr to be achieved and as a result Figure 2 below indicates that many of the scholars felt that the speed limit was inadequate (44%).

Although there has been considerable improvement to traffic calming across the eThekweni Municipality from the time of the original survey, some schools still do not have speed humps/bumps. The municipalities input could further reduce the 55% response rate reflected in Figure 2.

Site observations confirm that facilities in terms of dedicated drop off points were lacking.

From the possible problems listed in Figure 2, the majority of the scholars (59%) agreed that there is a traffic problem around school. This is inevitable as school journeys usually take place at peak times and have the same destination every day. Regular journey patterns are often easier to target with road safety programmes or travel demand management strategies since large numbers of people travelling to the same place at the same time increase not only the efficiency with which safety programmes can be delivered but also the potential for shared services (Morris *et al*, 2002). The potential for this has been included in the findings.

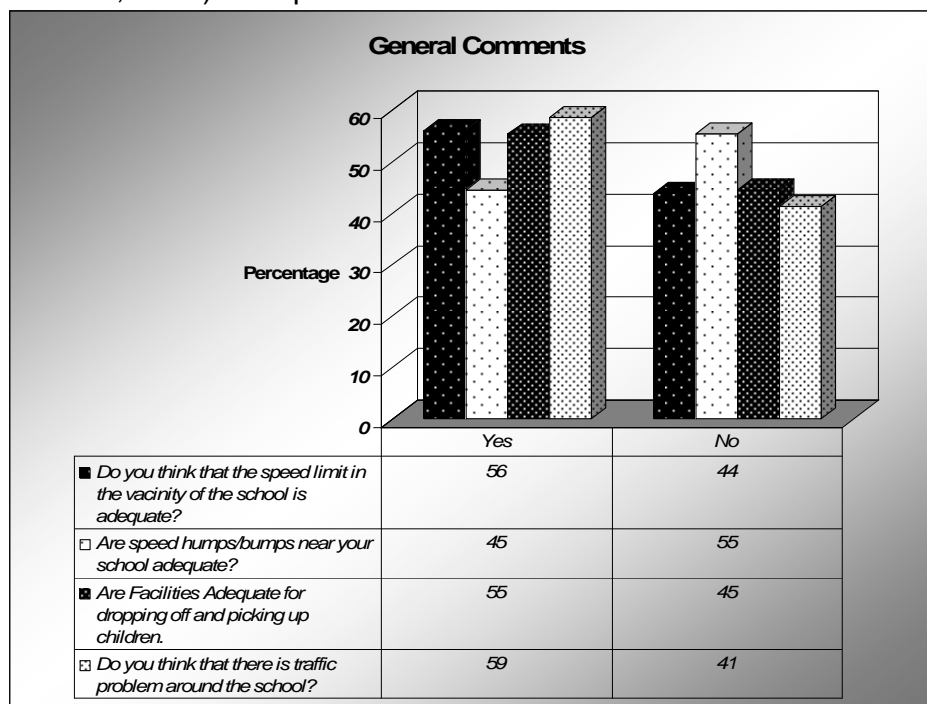


Figure 2. Scholars comments

The potential of a walking bus in which children are escorted as a group by trained and approved parents to school was targeted at car users. Collection could be from a convenient collection point such as a hall or car park. Figure 3 illustrates that 56% of the car users responded positively to the use of a “walking bus”. This project has the potential to reduce the congestion on roads during peak times thereby reducing the interaction between cars and pedestrians.

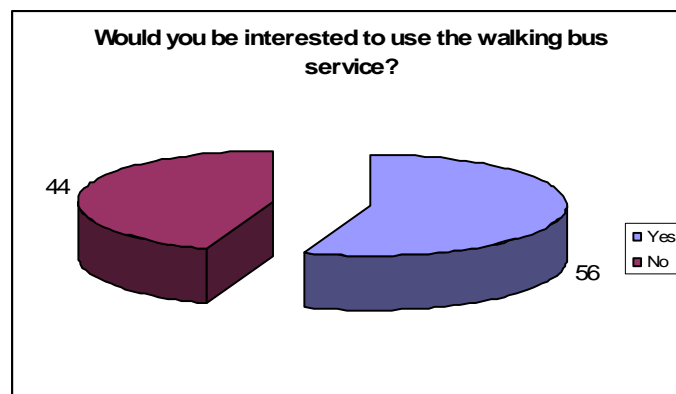


Figure 3. Potential of walking bus

The questions illustrated in Figure 4 below were targeted specifically at the pedestrians. As a general note from site observations and scholars response, more in terms of traffic calming, driver behaviour, road infrastructure can be done to make roads safer for scholars.

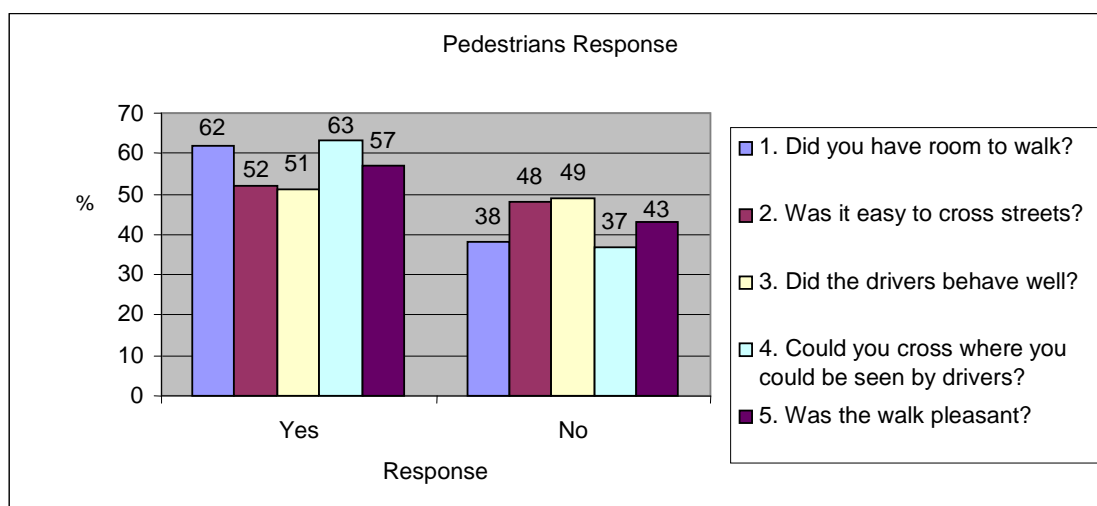


Figure 4. Problems experienced by pedestrians

Table 7 below shows that most of the bus and taxi users walked to the bus/taxi stop (85%).

Table 7: Mixed mode of Travel

	How do you get to the bus/taxi stop				Totals
	Walk	Cycle	Car	Other	
Average	85	0	13	2	100

The 2003 statistics for the eThekweni Municipality reflects that 38% of all children, in the 0-16 age group, injured in accidents were occupants of either minibuses or light delivery vehicles. This was an alarming statistics and therefore the following question was added in the main

survey. Figure 5 indicates that 5% of the respondents use this mode of travel.

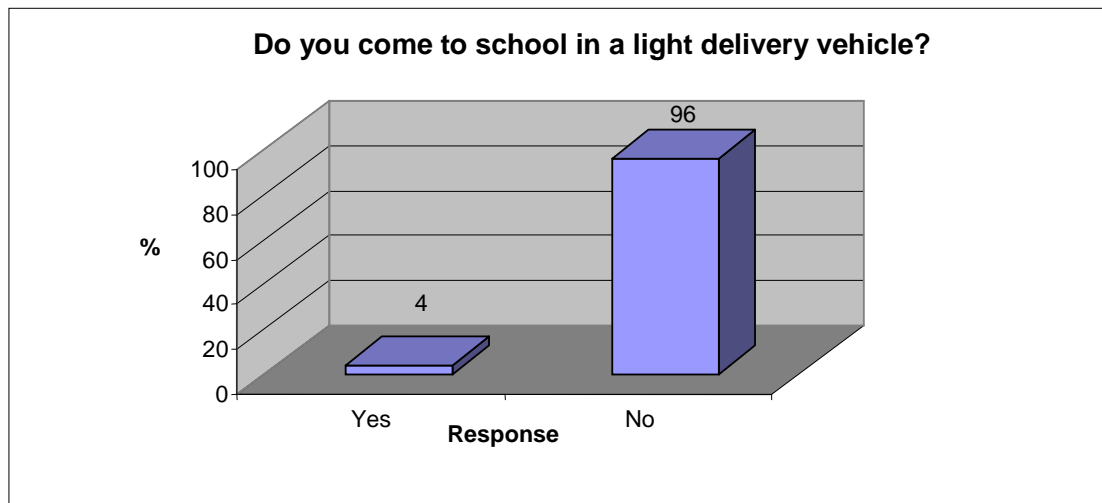


Figure 5. Scholars travelling by light delivery vehicles

3. SITE OBSERVATIONS

An on site assessment was conducted as part of the research. This included condition and geometrics of the road, signage, traffic calming, entrance facilities at school and a formal travel plan.

- ✓ Some of the schools speed limits were considered undesirable.
- ✓ Maintenance in terms of paint markings and signage were lacking.
- ✓ Facilities for cyclists are non existent.
- ✓ School involvement was either non existent, carried out by security personnel and in a few instances school officials and community members were involved.
- ✓ Although the majority of the schools have a points person, this was lacking in other schools. The points person was either a caretaker, security personnel or a member of the community who is generally retired. The absence of the scholars for this task has been noted.
- ✓ In many instances parents are forced to load and unload children on the main thoroughfare while in other instances parents found this more convenient although proper area were designated for this function.
- ✓ In a few instances, drivers did not obey the points person.
- ✓ Fairly wide roads together with speed limits in excess of 40km/hr and driver behaviour make it difficult for scholars to cross roads.
- ✓ An absence of a structured travel plan has been observed.

4. RECOMMENDATIONS AND CONCLUSION

Recommendations in terms of the role of the community, school and municipalities have been highlighted at the 24th Southern African Transport Conference (Dhoda & Allopi, 2005).

In addition, it appears that increased traffic flows deter parents from allowing their children to walk or cycle to school. On site investigations indicate the need for installing traffic calming measures around all schools to increase pedestrian and cyclist safety. Safe routes for walking and cycling will also need to be established. Facilities to safely store bicycles and wet clothing during periods of wet weather are also needed.

Internationally, authorities have issued a challenge to every school to encourage local people to come forward with their own ideas for implementing initiatives to reduce car use on the school journey. Winning entrants receive technical advice and assistance in developing their ideas from the Council. A similar approach could be implemented at Municipalities.

The position of schools along major roads can be overcome by stricter town planning legislations. The reality is that traffic calming and signage is installed long after construction. School zones needs to be established with minimum traffic claming, speed limits and signage before any new construction or extension of any school is undertaken. This can only be overcome with stricter legislations and enforcement.

As pedestrian safety receives more attention, the development of these and similar data collection techniques will assist transport officials in assessing and improving the safety of the walking environment near schools.

A holistic approach to road safety encompasses Engineering, Education, Enforcement and Encouragement. The four components will need to be addressed to improve scholar travel.

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