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 eThekwini 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 eThekwini 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%) (eThekwini Transport Authority, 2003).

Accidents involving children constitute 21% of pedestrian casualties, making them a high risk category (eThekwini 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 eThekwini 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 eThekwini 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 50% of all journeys, followed by taxi (23%), bus (13%), cars (11%), train (2%) 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 38%, followed by car (22%), taxi (19%), bus (16%), train (3%), and bicycle (2%).

If scholars were given a free choice, car is the preferred mode (37%). 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 eThekwini 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.
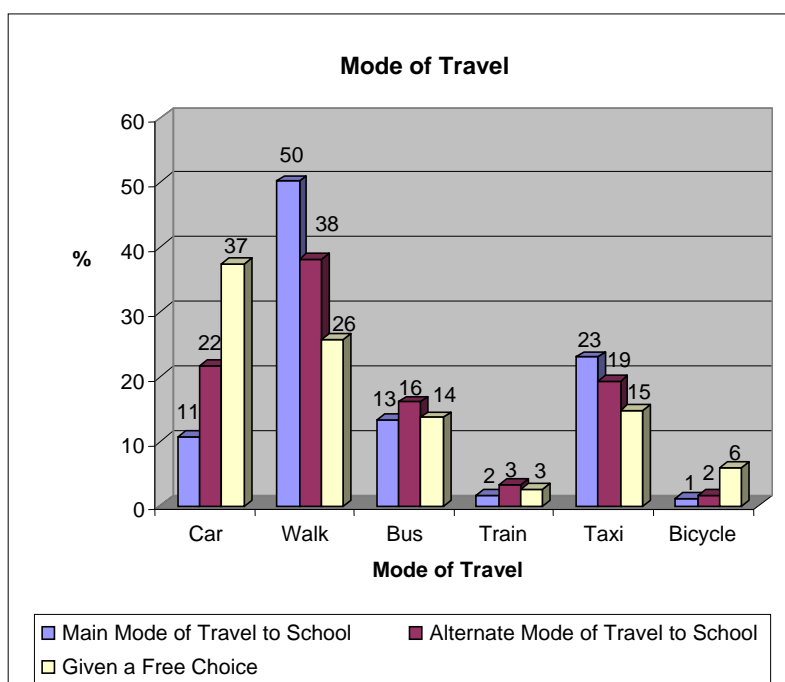
Figure 1. Mode of travel to school

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

<u>What about the safety of scholars?</u>
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 eThekwini 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.
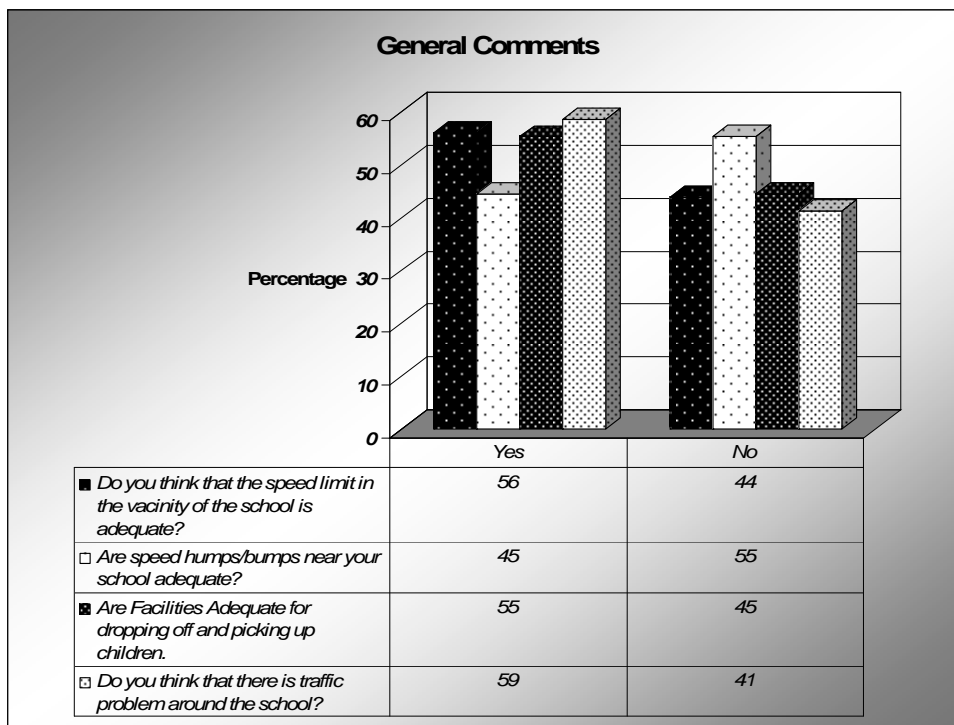
General Comments

	Yes	No
■ Do you think that the speed limit in the vacinity of the school is adequate?	56	44
□ Are speed humps/bumps near your school adequate?	45	55
▨ Are Facilities Adequate for dropping off and picking up children.	55	45
▨ Do you think that there is traffic problem around the school?	59	41

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.
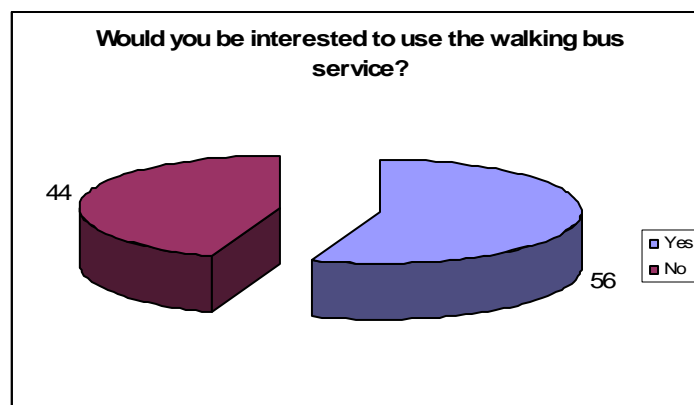

Figure 3. Potential of walking bus

The questions illustrated in Fiqure 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 bahaviour, road infrastructure can be done to make roads safer for scholars.
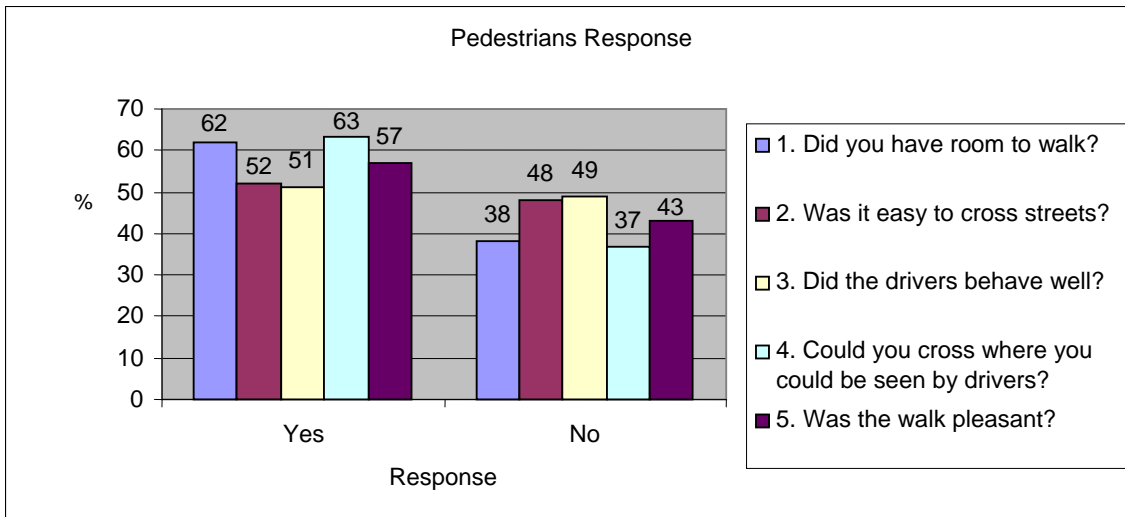
Figure 4. Problems experienced by pedestrians

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				
	Walk	*Cycle*	*Car*	*Other*	**Totals**
Average	**85**	**0**	**13**	**2**	**100**

The 2003 statistics for the eThekwini 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.
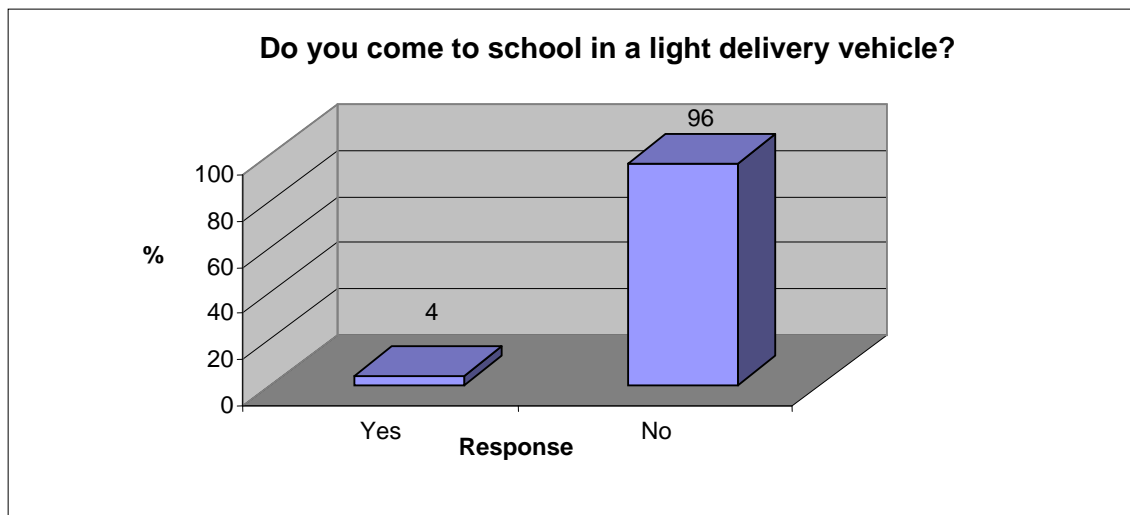

Figure 5. Scholars travelling by light delivery vehicles

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.

5. REFERENCES

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