ROADSMART
AN EVALUATION

An impact evaluation of a road safety education program
and the road crossing behaviour
of 7 year old children

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B.Ed

Submitted in (partial) fulfilment of the requirements
for the degree of Master of Education
in the Faculty of Education at the University of Melbourne
1997
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DECLARATION OF ORIGINALITY

This thesis contains no material which has been accepted for any other degree in any university. To the best of my knowledge and belief, this thesis contains no material previously published or written by any other person, except where due reference is given in the text.

Signature:

Corinne Leadbeatter
ACKNOWLEDGEMENTS

This study would not have been possible without the children and teachers involved - to them I am thankful and grateful.

I would also like to express appreciation to my supervisor Associate Professor John Owen, Centre for Program Evaluation for his direction and encouragement and to the Statistical Consulting Centre for their assistance with the use of appropriate statistical packages.

And a special “thank you” to Chris, Hannah, Paul and Jessica for their love, understanding and support.
ABSTRACT

National and international studies and statistics show that road trauma is the leading cause of injury and death of children to age 14 years. One contributing element of this trauma among children relates to pedestrian accidents. Reducing child pedestrian trauma is a complex problem requiring a multi-faceted approach. One approach is through education. This evaluative study explored the links between the implementation of RoadSmart, a new primary school road safety education program developed by VicRoads, and the road crossing behaviour of children in year 2. A process-outcome approach was employed which focused on both the implementation and outcome components of the year 2 “Walking safely” component of the RoadSmart program. RoadSmart offers children first-hand experiences of real-traffic situations and comprises two major parts - school based learning sequences and take-home activities, designed to involve parents/carers in educating their children about road safety. Pre and post unobtrusive observations were undertaken of participating children crossing the road at an unmarked mid-block location and were matched for 44 children. The program was also systematically observed in the classrooms of these students. The findings imply that if teachers implement RoadSmart in the intended manner, students cross roads more safely. Overall findings from this evaluation concur with those of other researchers (Demetre et al., 1993; Rivara, 1990; Roberts, 1980; Thomson et al., 1996), that children under 9 possess capabilities that can be fostered through education and real-street experience to enable them to function more effectively in the traffic environment.
CHAPTER 1
INTRODUCTION

1.1 STUDY CONTEXT

National and international studies and statistics show that road trauma is the leading cause of injury and death of children to age 14 years. One third of these involves pedestrians. The peak age for young pedestrian injuries is four to eight years and for deaths is three to seven years (Aoki & Moore, 1996). Reducing child pedestrian trauma is a complex problem requiring a multi-faceted approach. One approach is through education. Over the past thirty years there has been considerable research and literature published on the efficacy of road safety education programs based on an outcomes approach to behaviour change (Elliott, 1985; OECD, 1986; Penna, 1994; Rothengatter, 1981b, 1984; Thomson, Tolmie, Foot & McLaren, 1996; van der Molen, 1983).

Evaluation in general is dominated by an emphasis on measuring outcomes. Outcomes evaluation is typically the comparison of actual program outcomes with desired outcomes (goals). However, a problem with outcomes evaluation is that simply knowing that outcomes are positive or negative does not tell decision makers very much. What is missing is information about the actual nature of the program being evaluated. If the findings are positive, the evaluator is unable to supply documentation on what specific program activities brought about the desired outcomes. If the findings are neutral or negative or vary substantially across program sites, the evaluator is unable to analyse the reasons for the disappointing results. Lack of program effects may be due to inadequate extent of implementation, to differences among sites, to an inadequate research design.
or unreliable data, or to more basic flaws in the logic of cause-and-effect relationships embedded in the program theories (Scheirer, 1987). Are the most appropriate outcomes being measured in the first instance? In fact, unless a program is operating according to design, there may be little reason to expect it to produce the desired outcomes (Patton, 1986).

Delineating program implementation or program outcomes is a complex task. Establishing causal linkages between implementation and outcomes is even more difficult. It is not possible to establish causality in any final and absolute sense when dealing with the complexities of real programs in which treatments and outcomes are never quite pure, single, and uncontaminated. While we cannot provide definitive answers, we can arrive at some reasonable estimation of the likelihood that particular activities have had an effect (Patton, 1986). Error-free instruments do not and cannot exist in the measurement of complex human, social, behavioural and psychological phenomena. However they can be of value if one believes that rough ideas of the relationship between program activities and outcomes is preferable to relying entirely upon hope and good intentions. While it does not provide final answers it can provide direction.

1.2 STUDY FOCUS

This evaluation attempts to explore links between the implementation of one component of the primary school road safety education program RoadSmart - children and traffic.
safety and children’s road crossing behaviour – one of the behavioural outcomes relevant to the resource. RoadSmart has been developed as an educational program to meet the intentions of the Victorian Government’s Safety First Strategy issue “pedestrian safety”, targeting the identified vulnerable 4 - 14 year old age group (VicRoads, 1995a). The development of the resource is also consistent with VicRoads stated objective in the Traffic Safety Education Action Plan (1995b) to produce high quality educationally sound curriculum resources addressing appropriate attitudes and behaviours to support the implementation of traffic safety education. RoadSmart replaces Streets Ahead which was produced in 1988. Its development has been significantly influenced by the Streets Ahead Evaluation (Penna, 1994), the Streets Ahead Redevelopment Stage 1 Report (James and Associates, 1995), current road safety research and literature and curriculum trends. As a result two key issues addressed in the development of RoadSmart are:

- its attempt to reduce the identified gap between increases in knowledge and attitudes of traffic safety on the one hand and changes in behaviour on the other; and
- its provision of ways that parents/carers may be included in activities emanating from the school activities.

There are three books in the RoadSmart series designed for years prep to 2; years 3 and 4; and years 5 and 6 respectively. The activities presented in RoadSmart explore three road safety themes; “Walking safely”, “Playing safely” and “Travelling safely”. The “Walking safely” component aims to develop responsible pedestrian safety skills,
attitudes and knowledge. The “Playing safely” component aims to help children to choose appropriate places to play, encouraging the safe use of bicycles, skates and skateboards; and the “Travelling safely” component aims to promote safe passenger behaviour in a range of transport situations. RoadSmart offers children first-hand experiences of real traffic situations and comprises two major parts - school based learning sequences and take-home activities. Parents can be involved at two levels. The school based learning sequences encourage the teachers to involve parents/carers to assist with activities to reduce the adult to child ratio, and hence provide more opportunities for children to practise skills under adult supervision in the real traffic environment. The take-home activities are designed to actively involve parents and carers in educating their children about road safety and to foster a genuine link between home and school learning. This evaluation focuses on one of the behavioural objectives (road crossing behaviour) of the “Walking safely” component of the year 2 section of Book 1.

1.3 STUDY OBJECTIVES

This impact evaluation aims to:

- determine the implementation characteristics of the Year 2: "Walking safely" unit of RoadSmart - children and traffic safety (during its trialing phase); and
- determine if there is a relationship between implementation and children’s road crossing behaviour.
Prior to this study a comprehensive literature review was undertaken which helped to focus the direction for the development of the RoadSmart program. A program logic was developed including an objectives hierarchy. This evaluation links to the broader RoadSmart program.

The literature review sets out to summarise prior knowledge pertinent to conducting an impact evaluation in the context of teaching a pedestrian component of RoadSmart, to some year 2 (seven year old) children in a school setting. This entailed reviewing national and international research findings on the development of positive road safety behaviours within the context of primary school education programs and the evaluation of such programs or program components. This is followed by a discussion of the conceptual framework, setting the context for the focus of the program components to be studied, including a brief overview of the development of the program logic and objectives hierarchy for the RoadSmart program. The methodology is then outlined describing the evaluation type and design, scope and methods for data collection. The "process" component of the evaluation explores what happened during the implementation phase of RoadSmart, while the "outcomes" component seeks to explore any differences between before and after road crossing behaviour of selected matched children in year 2 at the chosen primary school. The findings are then presented, followed by a discussion setting out to explain any relationships between implementation and outcome findings. Finally, conclusions, implications and recommendations are discussed on the basis and in the context of this limited evaluation.
CHAPTER 2
LITERATURE REVIEW

This literature review aims to summarise prior contributions relevant to the background of this evaluation. It focuses on patterns of child pedestrian accidents, objectives of road safety education, factors that are likely to be associated with increased risk of pedestrian accidents, content and methods of teaching road safety to young children with particular reference to the skills and processes involved, the efficacy of different approaches to road safety educational programs and appropriate evaluations of such programs.

2.1 CRASH INVOLVEMENT

Australia, along with other developed nations has experienced significant reductions in its road toll in the last 25 years. The number of people killed has decreased by 47% from 1970 to 1995 (McFadden, 1996). However, among children, pedestrian injuries still rank as a leading cause of death in Victoria and Australia. In 1996 pedestrians still represented a large proportion of the road toll at 18% (76) of the Victorian road toll. Pedestrian safety is of particular concern in urban environments, reflecting the greater population density and more constant interaction with vehicles (VicRoads 1997). The total social cost of Victorian pedestrian casualty accidents is over $150 million annually, or around 15% of the cost of road crashes.

Many child pedestrian accidents take place when children play near traffic, cross roads,
or walk home from school. With the commencement of their schooling, children from age 5 or 6 years often begin travelling independently as pedestrians, thereby increasing their exposure to road injury or death. While a number of characteristics of casualty pedestrian accidents involving children in particular have been identified, in most cases they are blurred and difficult to sort out. However findings suggest the presence of precipitating and predisposing factors associated with crash involvement by pedestrians.

- Pedestrians are predominantly at fault in fatal crashes (74% of cases), (FORS, 1996 a).
- Nearly 50% of pedestrians killed entered the road from the side nearest the direction in which the vehicle involved was travelling. About 10% of these emerged from parked vehicles. 19% entered the road from the side furthest most from the vehicle involved and 17% were on the carriageway (FORS, 1996 a).
- Correcting for exposure, children up to the age of 10 years (in Victoria) have 4 to 11 times the risk of an accident as compared to other pedestrians (Struijk, Alexander, Cave, Fleming, Lyttle & Stone 1988).
- Children are involved in about 75% of the pedestrian accidents that occur on local streets, and the majority of these accidents are located in close proximity to the child’s home (Howarth & Lightburn, 1981, cited in Struijk et al., 1988).
- Child pedestrian accidents are greatest during the morning and afternoon peak periods, rates are particularly high for young boys during the afternoon 3.00 - 5.00 pm peak period (Struijk et al., 1988).
- The number of deaths that occur on the way home from school is nearly 4 times
higher than the number on the way to school (FORS, 1996 b).

- Pedestrian crossing facilities reduce the high risk for children crossing roads, however children’s risk is heightened when roads are crossed by children adjacent to the facility (Struik et al., 1988).

- Children run a greater risk when crossing near parked vehicles than when away from parked vehicles, the effect being strongest for younger children (Routledge, Repetto-Wright, Howarth, 1974).

- Of total road entries, one in five is obstructed, usually by parked vehicles - greater than 90% (Drummond and Ozanne-Smith, 1991).

- Approximately 80% of road entries involve walking with the remaining 20% of children running onto the road (Drummond and Ozanne-Smith, 1991).

- Children are more likely to stop when entering arterial roads (87%) than on local streets (43%) (Drummond and Ozanne-Smith, 1991).

- The proportion of children who do not look before entering the road is 23% for arterial roads and 36% for local streets (Drummond and Ozanne-Smith, 1991).

- 54.2% of pedestrians are involved in accidents at mid-block locations and 44% at intersections (Scavo and Rogerson, 1994).

- The majority (81%) of pedestrian accidents occurred in places where there was no traffic control (Scavo and Rogerson, 1994).

- 20% of accidents could be attributed to obstacles such as rubbish bins, telephone boxes and vegetation that obstruct the child's view of oncoming vehicles and the driver's view of the approaching child (Stevenson, 1997).
In summary, using roads as a pedestrian poses a significant health risk for young children (FORS, 1996 b). Road crash statistics throughout Europe and America reflect a similar pedestrian concern to that in Australia. In fact, child pedestrian crashes are widely regarded as the most serious of all health risks facing children in developed countries (Thomson, Tolmie, Foot, McLaren, 1996).

2.2 ESTABLISHING AIMS AND OBJECTIVES FOR ROAD SAFETY EDUCATION

One way of ameliorating the incidence of child accidents is through education programs, often based in schools. Road safety education programs need clear explicitly stated objectives (Rothengatter, 1984; Thomson et al., 1996; van der Molen, 1981; van der Molen, 1983; van der Molen, 1984; van der Molen, Rothengatter & Vinje, 1981). Without these a program is unfocused (and make evaluation difficult). Many road safety educational programs tend to set either general aims such as “reducing accidents” or centre around improving children’s knowledge about traffic or instilling positive attitudes towards safety. Implicit in such programs is the assumption that changes in knowledge or attitudes will lead to changes in actual traffic behaviour. However, empirical research on road safety education suggests that there is no necessary link between knowledge and behaviour at all. This therefore raises serious questions about the validity of much traditional road safety education.

One way of establishing objectives as outlined by Thomson et al., (1996) is to analyse
the problems posed by the traffic environment; the strategies by which an experienced pedestrian might solve these problems; and the underlying skills required in order for appropriate strategic behaviour to be possible. Van der Molen, (1983) states that the emphasis of educational programs should lie in acquiring behavioural abilities or changing inappropriate behaviour. Figure 1 (van der Molen, Rothengatter, & Vinje, 1981) specifies the type of information that could be used for formulating traffic safety educational objectives and the final determination of the content on instruction. It also indicates that a task analysis can help to structure the process. This is helpful for determining the content of instruction as well as for carrying out a proper evaluation of the instructional process (implementation) and outcomes.

Van der Molen (1983) identifies two levels of action behaviours in traffic safety situations. One is the behaviour undertaken to perceive the traffic environment, and the other is the behaviour which (theoretically) follows perception and internal processing. In most traffic safety education situations it is the consequential behaviour which is observed.
2.3 CHILD PEDESTRIANS

Thomson *et al.*, (1996) argue that pedestrians need to acquire a range of fundamental skills and to learn to use these skills strategically at the roadside in order to interact safely with traffic. The authors suggest that the skills described below are among the most critical.

**Detecting the presence of traffic** - Pedestrians need to carry out an effective visual search and to focus their attention on relevant cues. They need to demonstrate resistance to distractibility and an ability to co-ordinate visual and auditory information. Perception of crossing places as safe or dangerous are also factors influencing whether or not the pedestrian has been successful in detecting the presence of vehicles.

**Visual timing judgments** - Once a vehicle has been detected, a range of judgements concerning the vehicle’s movement must be made. The pedestrian needs to process information regarding the time available for crossing.

**Co-ordinating information from different locations** - Sometimes information has to be picked up separately from different directions and all the timing and other judgements made in relation to each of them.

**Co-ordinating perception and action** - This involves the ability to relate the time available for crossing to the time required to cross. The latter will vary according to characteristics of the individual’s own movement as well as to factors such as the width of the road.
The reviewed literature indicates that crossing the road requires competence in a range of primary perceptuo-motor and cognitive skills. Many studies have described children’s limitations when dealing with the traffic environment. The following provides a general picture.

- Children are inconsistent in their road safety behaviour (Sandels, 1970).
- Road crossing behaviour of girls is better than boys (Sandels, 1970).
- Small children are further disadvantaged because of their height - their lower eye level leads them to experience traffic differently, they cannot look over the top of cars to determine if traffic is approaching (Sandels, 1970). Sandels also concluded that children tend to forget instructions if something more interesting attracts their attention.
- Distractibility is associated with a large proportion of child pedestrian crashes, for example, when a child dashes out into a road (Sandels, 1975; Van der Linden and Goos, 1975 cited in Thomson et al., 1996).
- Young children have difficulty estimating the speed and distance of oncoming cars properly (Vinje, 1981).
- Young children have difficulty in judging whether there is enough time to cross the road before an approaching vehicle arrives (Lee, Young and McLaughlin, 1984).
- Under the age of about 9 years, children are poor at recognising dangerous places or at finding safer ones (Ampofo-Boateng and Thomson, 1990).
- Young children are unlikely to look for traffic before stepping onto the road.
(Grayson, 1975a cited in Thomson et al., 1996).

- Young children are less likely to look out well if they do not stop at the kerb or decrease their walking tempo (Van der Molen, 1981).

- Children often fail to look for traffic approaching from behind them (van der Molen, 1983).

- Children under 9 years of age tend to focus on a single factor in deciding if a crossing place is safe or dangerous (Ampofo-Boateng and Thomson, 1991 cited in Thomson et al., 1996).

Studies by Sandels stem from the general background of child development based on the Piagetian theories on child development. Sandels (1975) argued that children below the age of eight to nine years were inherently unsafe pedestrians. This tends to imply that children are constrained in what they can learn until an appropriate stage of psychological development has been reached.

Vinje (1981), who summarised Piaget's theory of the four stages of child development, also cautioned however that ages mentioned should be treated with great care because there are considerable differences between individuals and also because they depend upon the task the child is dealing with.

1. Sensorimotor stage - The child is not yet able to cope with traffic in any way.
2. **Preoperational stage** - From two to seven years of age the child's thinking is at first very concrete, bound to the immediate present, egocentric in the course of this stage. The child slowly becomes better able to control and decentralise its attention, leading to a better search of the environment. The child shows the beginnings of integration of information over time.

3. **Operational stage** - Between the ages of seven and eleven years, the child is able to reason about events not actually present and relate to events that have already taken place. They are able to anticipate what will happen in the future.

4. **Formal operations** - From around eleven years of age the child achieves an adult grasp of the principles of logical thought and causal thinking. The child is now able to participate in traffic as a pedestrian at an adult level, at least as far as intellectual development is concerned.

McLeod (1997) however, suggests that a Piagetian framework for analysis and interpretation of children's thinking is limited. She advocates that a Vygotskian orientation which takes into account the social context offers greater insight. Vygotsky viewed social interaction as structuring the child's immediate activities and also helping to form the process of learning and reasoning, thus building the child's ability to learn, reason, and to regulate his/her physical and cognitive abilities. According to Watson (1997), Vygotsky's theory agrees upon the constructive nature of cognitive development proposed by Piaget. It is in relation to the influence of social interaction that the two
theories differ. Watson believes that children's pre-conceptions need to be acknowledged and confronted if conceptual change is to occur.

Thomson et al., (1996) summarised that for Piaget, learning proceeds from context-bound actions towards increasingly generalised conceptual understanding. A child may perform at several different Piagetian stages at one and the same time, depending on the nature of the tasks and other factors. They see the real strength of Piagetian theory in its account of the process of development rather than in any indication of the timing of specific developmental changes. Thomson et al. summarise that for Vygotsky, all thought is the mental equivalent of action and has its origins with action, and that all organised action takes place in conjunction with those who have already mastered it (for example with an adult). Therefore, for Vygotsky, learning is grounded in a social context.

Schieber and Thompson (1996) summarise that the child's developmental stage dictates how she/he views and responds to vehicular traffic. They conclude that pedestrian training and education must fit the fundamental framework of the child's thinking to be effective.

Pettit (1996) emphasises the importance of taking into account the factors that influence young children's behaviours as road users. She states that although young children do not have the ability and understanding, too much is often expected of them. It is believed that the judgement, decision making and actions required for safe road behaviour can be
regarded as part of a problem-solving task. She summarises the problem solving processes related both to children’s development in general, and to behaviour in the traffic environment in particular (p.vi):

- Realisation that a problem exists and that steps have to be taken to reach a desired goal.
- Searching for and perceptually identifying relevant information.
- Drawing on existing knowledge and procedures in memory.
- Interpreting information in order to understand, reason and predict what might happen.
- Making decisions about direct action, or devising strategies or plans where appropriate.
- Taking action to reach the goal and monitoring and modifying actions as necessary.

Pettit summarises factors that contribute to the child’s problem-solving ability as cognitive development; impulsivity and self-control; concepts of safety, danger, accident; visual and auditory acuity; processes of attention; perception; processes of comprehension; risk taking and perceptual-motor skills. Educational road safety programs should combine realistic expectations of what children can accomplish with attempts to help them become more proficient. She claims that children do not passively absorb direct instruction, but must fit it into their own existing knowledge and understanding, making of it something uniquely their own. This means that if children
are to develop an understanding of the risks involved in traffic situations and the ability to solve problems in order to behave safely, they need guidance by adults within actual traffic contexts.

Overall, the reviewed literature indicates that a developmental trend exists suggesting that generally around 11 to 12 years of age a child, without any particular instruction, reaches the level of maturity similar to that of an adult to behave safely in traffic situations. This being the case, what are the implications for training children in pedestrian skills? According to Nummenmaa and Syvanen (1974) it would be unfortunate to assume this means that children are unteachable before then. They claim it would be dangerous to adopt a passive attitude to the teaching problem as so many children move around considerably prior to this age. Thomson et al., (1996) see most of the limiting factors as strategic rather than structural which suggests that appropriate training might reasonably be expected to have a facilitative effect on the development of such functions. There is evidence to suggest that components of the road crossing task improve with age and training. In fact, it appears that practical training can be successful with children as young as four years of age providing it offers the right kinds of experience. Thomson et al., (1996) argue that while a long-established tradition in road safety asserts that many road safety skills cannot be improved through education until a particular stage of development has been reached, this is inconsistent with modern research in psychology or with the majority view among developmental psychologists. Some encouraging findings from roadside training programs include:
• Improved correct road crossings using the real traffic situation (Reading, 1973).
• Improving visual training skills with children as young as five years of age (Demetre, Lee, Grieve, Pitcairn, Ampofo-Boateng and Thomson, 1993; cited in Thomson et al., 1996; Lee, Young & McLaughlin, 1984; Young and Lee, 1987).
• Improving the ability of five year olds to find safe places to cross the road (Ampofo-Boateng, Thomson, Grieve, Pitcairn, Lee and Demetre, 1993; cited in Thomson et al., 1996; Thomson, Ampofo-Boateng, Pitcairn, Grieve, Lee and Demetre, 1992).

Children need to be encouraged to conceptualise their own part in the total traffic situation and be given opportunities to practise through carefully controlled personal experiences. Roberts (1980) summarised that the capabilities of children with regard to vision, time/velocity estimations, attention, memory and rule understanding demonstrate spontaneous improvement with increasing age and that modification through teaching and direct experience is possible. Demetre et al., (1993) claim that the provision of training and practice in basic road crossing skills may reduce children's risk on the roads, as increasing automatisation of these skills can free attentional resources for more demanding aspects of road user behaviour.

It therefore seems evident that an important key to developing safe road practices in children is the teaching/training method adopted. Children need to be provided with the right kind of experiences in the real-traffic environment under adult supervision/instruction. This is discussed in greater detail in the next section.
2.4 TEACHING APPROACHES TO ROAD SAFETY

Education has long been advocated as a means of teaching children how to manage in the traffic environment. While there has been a reduction in the involvement of pedestrians in crashes with vehicles over the last 25 to 30 years, it is difficult to know how much of this may be attributed to the effects of education and how much to other factors. Thomson et al. (1996) argue that the situation has been exacerbated by the fact that few educational measures introduced at either the local or national level have been evaluated with regard to their effectiveness in improving children’s traffic behaviour (Thomson, 1991, cited in Thomson et al., 1996, p.13).

Ampofo-Boateng & Thomson, (1989) point out that road safety methods at the time of their study in Europe were fairly ineffective in teaching the skills that pedestrians needed to manage in the road environment. Findings by Roberts, Ashton, Dunn & Lee-Jo, (1994) are not optimistic either. They claim that none of the programs implemented to date in New Zealand have been shown to reduce injury rates. Elliott (1985: pvii) claims that:

Whatever the outcome, education or behavioural training, accident reduction is not the primary goal of most educational efforts and should not be the sole or major criteria for evaluation.
Thomson et al., (1996) note that there seems to be a widespread view at the present time that education has not achieved as much as had been hoped and that there may even be quite strict limits to what can be achieved through education. They fear that this view could lead to a shift away from education altogether and towards engineering or urban planning measures aimed at creating an intrinsically safer environment in which the need for education might be reduced or even eliminated. Thomson et al., see the possibility of this occurrence as unfortunate on two grounds. Firstly road safety education programs should be evaluated in realistic terms and according to their specific behavioural objectives. Secondly, there are many road safety education programs that do achieve positive outcomes. More attention should focus on those effective programs - what they teach and how, and what teaching methods and strategies are most effective and the combination of the two.

Ampofo- Boateng et al., (1993) question whether it is that educational programs are not effective in increasing safe road crossing practice or whether it is the teaching methodology adopted. Perhaps children are not taught what they really need to know in order to manage safely in the traffic environment. Many programs do not attempt to teach skills, but concentrate on knowledge acquisition and the development of appropriate attitudes towards road safety. Combining process evaluations - what is taught, with outcomes evaluations - what is achieved, would help to place the findings of such evaluations in context. That is what implementation leads to what outcomes? For example most of the programs evaluated in Europe were primarily cognitive based activities, relying on verbal classroom instruction. However, research indicates that
increases in knowledge about road safety does not seem to readily generalise to positive
behaviour change in the traffic environment (Bowen, 1985; Elliot, 1985; Rothengatter,
1981a & b). That is, there is no necessary link between knowledge or attitude measures
on the one hand and behaviour change on the other. (Nummenmaa & Syvanen, 1974;
on verbal instructions in the classroom can actually have negative effects because the
increased knowledge that children exhibit can create false impressions that their ability
to face the road environment is improving.

A review of recent school interventions show that teachers employ a variety of methods
to teach road safety in a variety of locations or contexts. These may include purely
verbal instructions in the classroom, the incorporation of videos and/or discussion
posters; table-top simulations, setting up play but realistic traffic environments on tables;
school ground simulations; visits to traffic schools; and real street practise and
combinations of one or more techniques.

While verbal instruction in the classroom situation seems to be the most popular, it is
also the least effective. Practical methods of instruction in pedestrian skills are the most
likely to be effective. Research agrees that teaching which occurs in the real traffic
situation is superior to training in any other situation. Such training programs have
produced positive results with children as young as five years, making them behave like
older, more experienced pedestrians (Thomson et al., 1996). Verbal instructions are
often far too general to transfer to children's behaviour. Therefore, verbal instruction
needs to be supplemented by something more concrete if road crossing skills are to be learned. Van der Molen and Van der Klaauw, (1983) identified four stages in the training of road safety behaviour:

- a modelling stage - the trainer demonstrates and verbalises the correct behaviour
- a practise together stage - the child is prompted and guided to perform the behaviour elements displayed in the modelling stage. The child is encouraged to verbalise behaviour and is praised for each correctly performed behaviour element.
- a practice alone stage - the child performs the behaviour alone and receives specific forms of verbal feedback
- an observation and reward stage - the trainer asks the child to cross the street at a different place and follows the child at some distance; after the child has completed the crossing procedure the trainer notes down and verbalises the child's performance and rewards the child for every correctly performed behaviour element.

Thomson et al. advocate that road-side training programs are needed which take children through the practicalities of finding safe places to cross the road. These should aim to help children discover what is dangerous about such situations through their own reasoning rather than through our reasoning. By promoting conceptual understanding and appropriate reasoning strategies, children can be taught to deal with any such situation. To maximise student learning by experience, it would be sensible to
use group sizes of between three and five children. Thomson et al. describe the strengths of adult-child interaction as compared to peer tutoring, the interaction between one partner who is the more competent (tutor) and the less competent. They advocate that adult-child interactions may be a more effective model than peer tutoring in the sense that the adult tutor may be more sensitive to the misunderstandings of the tutee and may be better able to respond to requests for help. Therefore it appears to be advantageous to create opportunities for adults and children to talk and interact about road safety.

Most researchers agree that traffic safety education programs need to shift from focussing on knowledge and using cognitive methods to providing children with purposeful practice in the real traffic environment. In summary, the reviewed literature identified a number of research findings pertinent to the development of effective traffic safety education programs.

- Effective training of pedestrian safety at an early age may provide some carryover benefit to later road use (Job, S. R. F. & Hatfield, 1996).
- Training in schoolyards proved to be inferior to training in street situations (Sandels, 1970).
- Training in real traffic results in greater increases in correct behaviour than training in any other conditions (Nummenmaa & Syvanen, 1974; Reading, 1973).
- Children possess capabilities that can be fostered through education and experience to enable them to function more effectively on the road (Roberts, 1980).
A crossing procedure should be given only when children have had extensive opportunity to explore their environment in a controlled manner. Children need opportunities to formulate basic rules in their own language through carefully controlled personal experiences. This procedure should be built upon children’s experiences in the traffic situations and not a didactic drill. (Roberts, 1980).

The ability to find a safe place is an essential precursor to the act of crossing the road (Michon, 1981, Thomson et al., 1996).

Learning how to cope with distractions needs to be an important part of the training program so that the child will behave correctly even if his/her attention is, for example attracted by other children (Michon, 1981).

Increase in exposure can also counteract the safety effects of a program (Rothengatter, 1984).

While school-based educational programs have been introduced for young children, it is generally recognised that such programs are more effective with the participation of parents (Antill, 1991; FORS, 1996b; Michon, 1981; OECD, 1983; Rivara, Bergman & Drake, 1989; Roberts, 1980; Scheiber & Thompson, 1996; Thomson et al., 1996; van der Molen & van der Klaauw, 1983). Antill conducted two studies on parental attitudes and road safety. The results revealed that the major concern of parents with children aged 5-7 years was their children’s ability to cross roads, from two points of view: the child’s limited ability to do this competently, and the careless or reckless behaviour of some drivers. From the parents’ perspective it was their responsibility to teach their children about road safety. School teachers were seen as having an important but lesser
role, but were also seen as doing somewhat less than they should. Antill’s studies suggest there is a good deal of concern about road safety and enthusiasm for road safety education programs that provide material for parents to use with their young children. In fact, parents indicated that they would be prepared to spend on average about two hours per week (Antill, 1990) teaching their children road safety. Other findings in the literature are summarised below.

- Many children become involved in pedestrian accidents despite adult supervision, as they often run ahead or lag behind (Sandels, 1975).
- Parents often provide bad examples for their children (Sandels, 1975; Van der Molen, 1983).
- Parents/carers play an important role in the development of their children’s safe traffic behaviour. The required investments in time and effort exceed the resources of the school (Antill, 1990, 1991; FORS, 1996 b; Michon, 1981; Roberts, 1980; Scheiber & Thompson, 1996; Van der Molen & Van der Klaauw, 1983).
- Parental expectations of their children’s pedestrian skills may be inappropriate and may be a fruitful area for injury prevention programs (Rivara, Bergman and Drake, 1989).
- Parents should not assume that because children can cross some streets under some conditions that they are ready for independent walking (Schieber & Thompson, 1996).
2.5 EVALUATION OF ROAD SAFETY EDUCATION PROGRAMS

Impact evaluation concerns the assessment of the learning outcomes or the instructional process itself or a combination of the two. An outcomes approach should answer the question to what extent the formulated objectives have been attained as a result of the instructional process. If the program has behavioural objectives, then Bowen (1985) argues that evaluation in terms of behaviour change appears to be most appropriate.

When the objectives are stated in terms of traffic behaviour the validity of the evaluation depends on two factors: the selection of the behavioural objectives and the methods used. It can be assumed that evaluation of behaviour in simulated street situations or semi-real situations are of little value when the behaviour is measured in the real traffic situation. Rothengatter (1981b) stated the following requirements for future traffic training programs and evaluations.

- Educational objectives should be carefully selected on the basis of their relation to accident occurrence.
- The content of instruction and its structure of presentation have to be stated explicitly and should clearly distinguish knowledge, behaviour and motivational elements.
- An evaluation should be carried out in terms of the process of instruction.
- An evaluation of the outcome should be carried out in terms of the educational objectives.
- A sharp distinction should be made between behaviour measured in test
situations and behaviour unobtrusively observed in real traffic situations.

- The results and conclusions of the experiments should be presented in such a way that they can be incorporated in the development of operational educational programs.
- In the development of operational educational programs traffic accident reduction of the target group should be used as a final measure of effectiveness.

The overall results of the Streets Ahead evaluation (Penna, 1994) suggested that over the crossing sites investigated and in the target group as a whole, the teaching of a traffic safety education program based on the Streets Ahead resource did not change children’s road crossing behaviour. This averaged absence of improvement in the target group was constituted from subgroups which showed no change, some which showed a decline in behaviour, and other subgroups which did show an improvement in crossing behaviour. Children from two schools showed improvements in their road crossing behaviour in the order of 10-15%, while a third school showed a small increase of 1-4%. The program in one of these schools appeared to have been conducted over three weeks for two to three hours per week. Two of the classes in this school spent around 50% of the time outside, and practised crossing behaviour at real sites. The other two classes spent 11-25% of the time outside but did not use crossing sites. This suggests that given the correct circumstances (implementation), the use of Streets Ahead could positively influence behaviour. Penna concluded the following:

On the evidence examined it is not possible to assume strong causal links between the teaching
approaches outlined above, and student outcomes measured by the evaluation. However in general terms the links seem to support the findings reported in the literature that practise in real life situations is prerequisite to behaviour change. (Penna, 1994: p.69)

Van der Molen (1981) argued that observational studies of child pedestrian behaviour seem to be the only valid way to assess how pedestrian tasks are carried out by children under particular conditions. Van der Molen reviewed 14 observational studies of children’s road crossing behaviour. He advocates the use of ethological methodology which is characterised by the use of a large variety of simple observable features of behaviour - rather than subjective categories such as “safe” or “unsafe” behaviour.

There are three types of road crossing observation methods presented in the literature; zone observations, following observations and time sampling. The following is based on a description of the three by Hakkert (1977). Zone observations involve the observer standing at a fixed position observing behaviour in a relatively small road area. In a short period of time many cases can be observed under the same conditions. Following observations involve repeated observations of the same individual. This method results in much fewer missing observations than zone observations. Time sampling involves walking along the streets while occasionally observing the momentary pedestrian and traffic situation.
2.6 SUMMARY

To summarise, the literature reviewed supports the notion that young children can be taught effectively critical road safety skills and behaviours. However, what denotes "effective" is often unclear. The OECD report (1983) claims that the most sensible position is to view the instruction of children as being an effective and desirable means of helping them to cope with the complexities of the modern urban environment. Having stated the relevance and importance of education, education should be seen as only part of an integrated approach to addressing the problem of the road safety of children (OECD, 1983; Rivara et al., 1989; Thomson et al., 1996; VicRoads, 1997). Road safety education programs need to consider:

- What to teach?
- When to teach?
- Where to teach?
- How to teach?
- Who to involve and how?

It appears that instead of adopting the view that there are strict limits to what can be achieved through education, it would be productive to establish effective traffic safety education programs with clear objectives and appropriate methods of teaching to achieve desired behavioural outcomes. It is important to establish clearly stated specific objectives which address the road safety problems experienced by child pedestrians and the skills required in order to improve their safety in the traffic environment. The critical
factor is the appropriateness of the training method, not simply the age of the child (Thomson et al., 1996). The effectiveness of training depends on the situation in which it is carried out. Road safety programs which assume that children will spontaneously extend understanding gained in one context (e.g. classroom) to behaviour in another (the roadside) are poorly supported by theory and empirical evidence. Training outside the normal environment is generally less effective. It is better to focus on promoting development in the context in which the learning will be used (roadside). An important finding to encourage the use of training at the roadside as opposed to verbal instructions in the classroom is that unobtrusive observation has provided evidence of generalisation to everyday traffic behaviour (Thomson et al., 1996). The active involvement of parents/carers/adult volunteers provides opportunities for small group work within the school based road safety program and also extends the learning experiences of children to their immediate traffic environment.

This study further explores the link between teaching a component of a road safety education program (process) and behaviour change in children's road crossing practice (outcome). The focus is on the behaviour change of children crossing the road in the real traffic environment. As it is well documented that children's knowledge can increase as a result of an instructional process, this was not the focus for this study. The more important objective is to influence positively the road safety behaviour of children. In particular, this study was concerned with the road crossing behaviour of seven year old children who participated in the RoadSmart program.
CHAPTER 3
CONCEPTUAL FRAMEWORK

3.1 PROGRAM LOGIC DEVELOPMENT

Smith (1988; cited in Owen, 1993: p. 5) defines a program as

a set of planned activities directed toward bringing about specified change(s) in an
identified and identifiable audience.

This suggests that a program has a documented plan and that action is consistent with
the information contained in the plan. Program logic is defined as a plan which connects
objectives, implementation and outcomes (Owen, 1993). Outcomes hierarchies are an
essential component of a program logic. An outcomes hierarchy is a chain in which the
attainment of one outcome depends on the attainment of a prior one. Suchman (1967;
cited in Owen, 1993) suggested that program objectives and outcomes could be
classified as immediate, intermediate and ultimate. However Patton, (1986) noted that
in many cases there are more than three discrete levels of objectives. He sees it as more
of a continuum of objectives moving up through the hierarchy chain of immediate,
intermediate and ultimate objectives. Immediate objectives logically precede intermediate
goals and therefore must be accomplished before higher-level objectives. The higher one
moves up the chain of objectives, the more difficult it generally is to measure them.
Rivara et al., (1989) state that prevention of pedestrian injuries requires a multifaceted, multidisciplinary approach. VicRoad's approach to road safety is broad in scope encompassing human, vehicle and road factors. Safety First sets out the Government's road safety strategy for Victoria. This document outlines the governments multidisciplinary approach to reduce the level of road trauma in this State. Key strategies identified are:

- improved research and education
- promotion
- engineering solutions
- enforcement of road laws
- coordinating the efforts of all related agencies.

Figure 2 outlines the objectives hierarchy developed for the RoadSmart program prior to this evaluation, during the formation of the program logic for the RoadSmart program. The immediate objective is to provide a curriculum resource which enables school communities to plan, develop and teach their own ongoing traffic safety education program. The intermediate objectives are concerned with implementation of RoadSmart in schools, the extension of activities into the home environment and the development of behaviour in children conducive to safe and responsible traffic practices. It is with the intermediate objectives (objectives 4, 5 and 6) that this evaluation is focussed, and more specifically, only with the "Walking safely" component of the year 2 section. The process part of this evaluation documents all of the implementation
characteristics during the teaching of the "Walking safely" learning sequences to the children in year 2. The implementation characteristics are matched against the stated objectives for the specific learning sequence. The outcomes component, however, focuses on one of the key behavioural objectives - that "this learning sequence will help students to demonstrate safe crossing procedures at unmarked crossing points under adult supervision."

The ultimate aim of a child pedestrian education program is a reduction to the incidence and severity of road crashes occurring to child pedestrians. This is therefore theoretically the ultimate criterion for evaluation. However, very few education programs have been evaluated in terms of crashes, since crashes are influenced by many factors besides the behaviour of involved parties (Gardner, Rowley, Bowen, Hayman, Fyfield, 1986; Rothengatter, 1981a) and it is unrealistic to expect a specific road safety education program to yield in the short-term a reduction in road trauma that is measurable and that can be directly attributed to the program. Pedestrian accidents are too rare occurrences to offer a viable evaluation criterion unless an educational program is sufficiently widespread. Even if the program was widespread, it would be difficult to demonstrate conclusively that education reduces the crashes.
OBJECTIVES HIERARCHY

ROADSMART

ULTIMATE

7. To contribute to a reduction to the incidence and severity of road crashes to primary aged children.

OBJECTIVE

INTERMEDIATE

6. To develop and foster behaviour change in children conducive to safe and responsible traffic practices.*

OBJECTIVES

5. To make parents/carers aware of their children’s physical and psychological limitations in dealing with traffic and to involve them as active partners in their children’s supervision and learning.*

4. To implement the curriculum resource in primary schools.*

3. To train teachers to use the traffic safety education resource.

IMMEDIATE

2. To develop a new primary school traffic safety education resource.

OBJECTIVES

1. To research the literature on effective road safety programs.

* The focus of this evaluation

Figure 2. Objectives hierarchy for the RoadSmart program.
3.2 EVALUATION QUESTIONS

The initial evaluation questions are:

- Are the RoadSmart curriculum materials being implemented in the intended manner, has implementation occurred and to what extent has implementation occurred?
- Does the road crossing behaviour of children improve as a result of the teaching of the RoadSmart materials?
- Is there a relationship between program implementation and children's road crossing behaviour?

A working hypothesis is that good program implementation of the RoadSmart Year 2 "Walking safely" section can improve the road crossing behaviour of children in year 2.

3.3 TRIAL AND REVIEW OF ROADSMART CURRICULUM MATERIALS

This evaluation was conducted parallel to a broader formative evaluation conducted across primary schools in Victoria for the trial and review of the RoadSmart curriculum materials prior to publication. This aimed to:
• Guide refinement of the two major components of the RoadSmart program: the school based learning sequences and the take-home activities.
• Ascertain how well the conceptual framework of the program works through an armchair review of program materials.
• Demonstrate how well the materials work through a limited trial of the "Walking safely" learning sequences.
• Ascertain how accessible the materials are for teachers and parents.
• Identify possible difficulties in implementation of the program and some ideas for ways these maybe overcome.

A range of data were collected using the following techniques:

• Teacher questionnaire booklet for an "armchair review"
• Teacher questionnaire booklet for trailing the “Walking safely” sequences
• Parent/carer surveys
• Sample collections of completed student Blackline masters (reproducible student activity/record sheets) and take-home activities.

Thirty-seven teachers across eleven primary schools participated in the trial and review of the RoadSmart materials. This included 27 trials of the "Walking Safely" units across prep to year 6 and 21 reviews of the material across prep to year 6.

As a result of the findings minor changes were made to improve the RoadSmart
materials in line with feedback. While there was a high degree of agreement with the content, lesson sequence outline and wording, most difficulties were encountered with the implementation of the activities conducted in the real street environment. Comments indicated that this was due to the difficulty of securing assistance from parents/carers during the school day, rather than the appropriateness or relevance of the activity. Some of the comments were also in the context of the timing of the trial and review - constraints of the evaluation period. This was conducted during term 1, 1997. Some of the confronting issues were:

- at the start of a new school year teachers do not know the children as well as they do later on in the year
- there were several days of excessive temperatures (35 - 40 degrees Celsius)
- LAPS testing
- school sports
- prep classes with early dismissal times during this time of the year.
CHAPTER 4

METHODODOLOGY

This chapter discusses the type and scope of the study, who was involved in the study and how the study was undertaken. The instruments used to gather data and the study design are also discussed. The merits and limitations of this method along with how these have been minimised in the study are also discussed in the relevant sub-sections.

4.1 TYPE OF STUDY

Patton (1986: p.14) states that

program evaluation is the systematic collection of information about the activities, characteristics, and outcomes of programs for use by specific people to reduce uncertainties, improve effectiveness and make decisions with regard to what those programs are doing.

This impact evaluation adopts a process-outcome approach. That is it focuses on both the implementation and outcome phases of the program. Outcome evaluations generally focus on goal attainment whereas process evaluations focus on the means of attaining goals (Patton, 1986). Process evaluations focus on the internal dynamics and actual operations of a program in an attempt to understand its strengths and weaknesses. This type of approach means becoming intimately acquainted with the details of the program.
Patton discusses the importance of "unlocking the black box" or finding out what happened during the implementation phase to assist with explaining the outcomes. The first being to establish whether the program exists. How close to the ideal must the program be before it can be said to be fully implemented?

Process-outcome evaluations are concerned with the following questions:

- were the objectives translated into program delivery? (process), and
- were the objectives achieved and what were their effects? (outcome)

In the context of this evaluative study, the following formed the guiding questions:

- Were the RoadSmart curriculum materials implemented in the intended manner (did implementation occur) and to what extent? (process)
- Did the children's road crossing behaviour improve as a result of the teaching of the RoadSmart materials? (outcome)

A third question incorporates the process component into the outcomes component to provide useful contextual information.

- Is there a relationship between program implementation and children's road crossing behaviour? (process-outcome)
The implementation component places the outcome findings in context. Were there components left out? If so, were these critical to the achievement of students' learning outcomes? Were the materials adapted or modified? If so, how and did this alter the desired outcomes?

Chapter 3 provided the conceptual framework for this study. This study focuses on the intermediate objectives of the RoadSmart program:

6. To develop and foster behaviour change in children conducive to safe and responsible traffic practices.
5. To make parents/carers aware of their children's physical and psychological limitations in dealing with traffic and to involve them as active partners in their children's supervision and learning.
4. To implement the curriculum resource in primary schools.

This evaluation specifically focuses on the implementation of the “Walking safely” component of the Year 2 section of Book 1. The objectives for the three learning sequences implemented and observed for the context of this study are listed below.

Learning sequence 1 helps students to:

- identify what makes a footpath safe or unsafe
- formulate strategies for dealing with unsafe footpaths
- demonstrate safe pedestrian behaviour
Learning sequence 2 helps students to:

- demonstrate the safe use of the school crossing under adult supervision
- demonstrate safe crossing procedures at marked and unmarked crossing points under adult supervision *
- identify factors that affect seeing and being seen

Learning sequence 3 helps students to:

- explain how their behaviour may affect the safety of others
- identify situations that may make road crossings difficult
- formulate strategies to deal with unsafe situations

* This behavioural objective forms the focus for the outcomes component of this evaluation.

This evaluation was conducted in one school across two year 2 classes. The findings from this study relate to this particular case and are not generalisable to other cases.
4.2 **SCOPE**

During term 4 1996, a metropolitan State primary school was invited to participate in this process-outcome case study. The following criteria influenced the choice of the school.

- the Principal was willing to co-operate with the study
- the school was a co-educational government primary school
- two year 2 classes with experienced teachers were willing to implement the "Walking safely" section of the *RoadSmart* program during the broader trialing phase of these materials planned to be carried out during term 1 of 1997
- the teachers were agreeable to their classes being observed during the teaching of the *RoadSmart* program
- safe and close access to a quiet street was available for the children to cross at a mid-block location
- there was a safe mid-block location for children to cross the road without specific instructions by adults (clear line of vision in both directions)
- the capability for children to be filmed unobtrusively while crossing the road at a mid-block location existed
- there was parental involvement and support in school based programs
- the school was in close proximity for travelling purposes and flexibility for class observations to be conducted.
There is a general perception that teachers feel they have increasing pressure to accommodate more and more into their teaching role and there is increased competition for curriculum space. It was not the intention of this study for teachers to feel even more "stressed". Therefore, while conducting this case study in the context of a school environment, the following decisions were made:

- intrusion into the normal conduct of the school was to be kept to a minimum
- to negotiate suitable times to unobtrusively film children crossing the road (this would have to be the same day and time for both the pre and post observations)
- teachers were asked to set aside one to two hours per week for a three week period for the teaching of the RoadSmart materials
- the teachers were to nominate when they would teach and for how long.

The evaluation was conducted in one State primary school and involved two year 2 teachers and their classes (55 students in total, comprising 29 girls and 26 boys). For the purpose of the pre and post observation studies, data was matched for 44 children. The study set out to understand, document and analyse the reality of the implementation of the Year 2, "Walking safely" unit of the RoadSmart resource and to determine if there were any changes in student road crossing behaviour as a result of the implementation. This entailed the classes completing three lesson sequences, comprising three school based lessons and two take-home activities.

In December, 1996 a year 2 teacher was nominated as a "contact" person who was to
assist with the subsequent briefing of the additional year 2 teacher to be involved in 1997. The teacher who initially acted as the "contact" person at the end of 1996 was placed with a different year level than was anticipated in 1997. Hence teacher liaison had to begin again at the start of the school year in 1997. Time pressures were considerably greater at this time of the year as compared to the end of the previous year. Both teachers were briefed to "trial" the RoadSmart materials as outlined in the draft resource, however were not "trained" as to how to teach the materials. Early draft materials were provided to the school at the end of the 1996 school year and trial materials supplied to the teachers a few weeks prior to the planned implementation. The two teachers were encouraged to ask questions if necessary regarding the implementation of the program, however due to time constraints with day to day teaching it was not possible to "train" the teachers how to use the resource.

For the purpose of the outcome component, unobtrusive videoing of the children was conducted as they crossed a road at an "unmarked" mid-block location both before and after the teaching of the RoadSmart program (Figure 3). The teachers arranged class walks to facilitate the pre and post observations to take place. The pre and post walks:

- suited the purpose of other programs
- occurred during mornings
- had the same adults present who were briefed so they understood the purpose of the filming was to observe children's "natural" road crossing behaviour, not to instruct children when or how to cross, and were to intervene only if the
children's safety was at risk.

While it was planned to conduct pre and post observations at the same times and on the same days, school activities necessitated a change in the post observation recording day from Friday to Thursday, however morning times were maintained.

Figure 3. View of the site where children were filmed unobtrusively as they crossed the road.
Table 1. Study Design for the process-outcome study

<table>
<thead>
<tr>
<th>Pre-observations</th>
<th>Process</th>
<th>Post-observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>unobtrusive road crossing</td>
<td>implementation of <em>RoadSmart - children and traffic safety</em></td>
<td>unobtrusive road crossing</td>
</tr>
<tr>
<td>observation</td>
<td>•observations</td>
<td>observation</td>
</tr>
<tr>
<td>•video record</td>
<td>•photos</td>
<td>•video record</td>
</tr>
<tr>
<td></td>
<td>•document analysis</td>
<td></td>
</tr>
</tbody>
</table>

Table 1 illustrates the basic study design. Isaac and Michael (1995) describe one group pre-test - post-test design as one with minimal control. The sequence of events which were undertaken for this evaluation follows.

1. Unobtrusive observations of the road crossing behaviour of year 2 children (pre-observations) before exposure to the *RoadSmart* program were made.

2. Children participated in the *RoadSmart* road safety program for a period of three to four weeks and observations of program implementation were undertaken (process study).

3. Unobtrusive observations of the road crossing behaviour of year 2 children (post-observations) after exposure to the *RoadSmart* program were made.

4. Observational findings were analysed to determine whether any differences were evident and significant (outcome).

5. Findings were analysed to determine if any relationships existed between implementation and children's road crossing behaviour.
To have greater generalisability and less weaknesses in design, this evaluation could have included a control group. However, this would have entailed the inclusion of additional classes, possibly more schools and would have changed the focus of the study. Using multiple schools and classes can complicate evaluations. The effect of the teacher, the amount of time spent on implementation, the emphasis placed upon various topics and style of teaching cannot be totally controlled. Such uncontrolled variations will tend to reduce the likelihood of overall significant effects being detected (Clayton, Platt, Colgan, Butler, 1995). This was an impact evaluation exploring in depth the relationship between implementation and behavioural outcomes. Given the nature of the specific road safety intervention, and the significance of the findings, it is unlikely for children to experience this teaching under natural circumstances. It is therefore argued that in this case there was no need for a control group.

<table>
<thead>
<tr>
<th>CLASS</th>
<th>Pre-test 14/2/97</th>
<th>Implementation 28/2/97 - 21/3/97</th>
<th>Non-teaching period 2 weeks</th>
<th>Post-test 3/4/97 9:30 a.m.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>Friday 9:45 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2B</td>
<td>Friday 9:15 a.m.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Timing of process-outcome evaluative case study

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4.3 INSTRUMENTS AND DATA

Data were collected relevant to the intermediate objectives stated in the objectives hierarchy:

6. To develop and foster behaviour change in children conducive to safe and responsible traffic practices.

5. To make parents/carers aware of their children’s physical and psychological limitations in dealing with traffic and to involve them as active partners in their children’s supervision and learning.

4. To implement the curriculum resource in primary schools.

The fifth objective was only partially measured by means of take-home activities completed and returned to school. Some parents/carers had recorded comments on the parents feedback page, however these can only provide insights to the level of involvement with their child and not what actually occurred.

This evaluation did not collect data relevant to cognitive gains, but focussed on behavioural gains. While many road safety programs have successfully demonstrated improvements in cognition, by and large they have not successfully demonstrated significant improvements in road crossing behaviour. This may be in part due to the evaluation design or the design of the road safety program evaluated or a combination of the two. As this road safety program has been designed to have a positive influence on children’s road crossing behaviour, energy has been devoted to devising a means of
measuring one behavioural aspect of *RoadSmart* - children's road crossing behaviour at an uncontrolled mid-block location.

A range of data were gathered from teachers and students. A summary of the information collected is presented below.

(a) Information was collected from teachers by direct observations during the implementation of the *RoadSmart* program component, both in the classroom and in the real-street environment. Photographs were taken as supporting evidence of implementation. The photographs provided a permanent record of the types of activities the children participated in as well as the setting and interactions in some cases.

(b) Information was collected from and about students in the form of class work, take-home activities, direct observations and photographs. Completed work from the school based activities (Blackline masters) was collected and analysed. Students take-home activity folders were also collected. In some cases, parents/carers made comments which provided further insight into the type and level of parent/carer involvement. Direct observations of students while participating in the *RoadSmart* program at school were undertaken and documented. Photographs provided additional collaborative evidence of what actually happened during the implementation phase. Unobtrusive video observations of the road crossing behaviour of the children who participated in the *RoadSmart* program both before and after the implementation phase provided a permanent record for later scoring and analysis.
4.3.1. Implementation Data (process)

An "implementation characteristics" record sheet was developed based on a fidelity approach to determine if implementation occurred as intended. That is, did actual implementation match with what was intended and to what degree (Fullen and Pomfret, 1977). McLaughlin (1976) points out that classroom based projects require teachers to work out their own styles and classroom techniques, therefore the very nature of programs such as RoadSmart require that implementation be a mutually adaptive process to the particular school and classroom. It is expected that implementation may change over time within sites and display considerable variability from one school and classroom to another (Berman and McLaughlin, 1976). The implementation characteristics record sheet detailed the specific objectives of each lesson sequence and the individual teaching/activity components and teaching characteristics incorporated (Tables 4, 6 and 7). As well as recording whether or not the material was taught it was also important to record if it was taught in the intended manner. For example as well as content, the method and teaching approach may also be important in achieving the desired student outcome(s). Some activities required small group work while others individual work or practice in the real street environment in small groups with an adult. The "implementation characteristics" were rated according to their perceived importance in order to achieve the desired outcome - improvement in child road crossing behaviour.

Merriam (1988, cited in Erlandson et al., 1993), compiled a checklist of elements likely
to be present in an observation. These form the basis for recording the general characteristics during the implementation phase of this evaluation.

- The setting: what is the physical environment like? What is the context? What kinds of behaviour does the setting promote or prevent?
- The participants: the teaching methods employed (ie. small group work, role plays, class discussions) who is in the scene, how many people, and what are their roles?
- Activities and interactions: what is going on? Is there a definable sequence of activities? How do the people interact with the activity and with one another? How are people and activities connected or interrelated?
- Frequency and duration: when did the situation begin? How long did it last? How typical of such situations is the one being observed?
- Subtle factors less obvious but perhaps as important to the observation are:
  * informal and unplanned activities
  * symbolic and connotative meanings of words
  * nonverbal communication such as dress and physical space
  * what does not happen - especially if it ought to have happened.

Implementation data was recorded using pen and paper on "location", the location where the lesson was taught (Appendix A). Written recordings of class observations were complemented by photos and the collection of student work which aid to validate the process.
4.3.2. Road Crossing Observations (Outcome)

Webb, Campbell, Schwartz and Sechrest (1966 in Kellehear, 1993) summarise the advantages of unobtrusive videoing methods which:

- tend to assess actual behaviours as opposed to self-reported behaviour
- can be easily re-checked and re-analysed by others
- allow greater detail in observation and analysis to emerge
- provide a permanent record
- allow reliability checks
- aids memory.

The method for both unobtrusively videoing and scoring road crossing behaviour from a video was the same as that for studies conducted by Oxley, Fildes, Ihsen, Day and Charlton (1995). The scoring instrument used and procedures in this case were verified by Oxley.

The overall aim was to obtain as many matched pre and post observations of the year 2 children crossing a road at a mid-block location as possible, while at the same time being as natural as possible. To achieve this, unobtrusive video equipment was set up to record the pre and post road crossing behaviour of the year 2 children involved in the study. Filming occurred in the context of students participating on a class walk. Children were required to cross the road at a pre-arranged mid-block location on a quiet back street.
Teachers were asked to arrange for parent/carers to assist so that children would be in smaller groups. It was important for recording purposes to have students cross the road in pairs. To facilitate filming, it was also important that each pair began to cross only when the previous pair had completed their crossing and began to walk off. The adults were instructed to stagger the timing to avoid a large cluster of children waiting to cross at the same time. This gave the camera person time to focus the camera on the next pair of children. Adults were briefed that the purpose of the filming was to observe as much as was possible the children's natural road crossing behaviour. So unless to avoid compromising children's safety, adults were asked not to make any reference to when or how children should cross the road. Instead the teachers gave the children tasks unrelated to road safety for the purpose and duration of the walk.

A van parked on the opposite side of the road was set up with two video cameras to provide video images of oncoming traffic and pedestrian movements (see Figure 4). Camera 1 was attached to the steering wheel and focussed on-coming (near side) traffic. Camera 2 was directed at a designated crossing point directly opposite the van and tracked pedestrians as they crossed the road. This was operated through the side windows of the van which were blacked out so that children could not see in. Figure 5 shows the general set up of the video recording equipment. This was similar to that used by Oxley et al., (1995) while unobtrusively filming older and younger adult pedestrian road crossing behaviour.
Figure 4. Plan of observational filming

Figure 5. Equipment used for on-road observations of child pedestrian behaviour (Reproduced with permission from Jennie Oxley - in Oxley et al., 1995).
4.3.3 Scoring Child Road Crossing Behaviour

Time counts set at 1/25 sec were burnt onto video images enabling behaviour to be scored in detail. The scoring sheet developed for recording children's road crossing behaviour (Appendix B) from the video is based on that developed by Oxley (1995) to score the road crossing behaviour of older pedestrians. This allows for a comparison of the quality of the road crossings between the pre and post observations. The behaviours scored were divided into two stages:

(i) At the kerb (prior to crossing the road)
- time spent at the kerb prior to crossing the road (assumed decision making time)
- the number of head turns and the time spent making nearside (right) and far side (left) head turns
- rate of head turns

(ii) Road crossing
- number of head turns and the time spent making nearside (right) and far side (left) head turns
- rate of head turns
- time spent looking ahead, at the ground or other
- time spent completing the road crossing task
The advantages of using this method were:

- Students could be recorded individually.
- A total of 44 students could be matched pre and post implementation of *RoadSmart*.
- Most students were not aware that their road crossing was being recorded.
- Students' safety was not compromised.

The disadvantages of using this method were:

- The road crossings did not occur in totally "natural" conditions.
- A few students noticed the video.
- As I had been observing the students during the teaching of this program, they may have associated me with "road safety" for the post test.

4.4 VARIABLES

Both teachers taught the materials in the afternoon, however on different days. One class was taught on Thursday afternoons over a three week period and the other on Friday afternoons. However both teachers felt that the children would have been more attentive had they been taught in the mornings when in fact the pre and post observations were conducted. Perhaps greater improvements could have been gained had the children participated in the activities during the mornings. Both teachers covered much of the
same content, however both preferred teaching in the classroom.

In this study both teachers taught the program in very similar ways and spent approximately the same proportion of time in the real street environment compared to inside the classroom. The variables controlled for are listed below.

- The education level of the children (all year 2).
- The same primary school.
- The experience of the teachers.
- The teaching materials provided.
- The times both classes were taught and observed (during afternoons).
- The parents assisting with the pre and post observation walks.
- The location in which the observations were made.
- The instructions provided to the children by the teacher/parent.
- Scorer bias in scoring crossing behaviour from the videos.
- Fatigue and boredom were controlled by frequent breaks and regular re-checking of scoring.

Observers may make systematic errors due to their specific expectations regarding the behaviour to be scored. One possibility of controlling for these effects is to compare the observations with those of an “expert-observer”. In this case initial scoring was compared and discussed with those of Jenny Oxley (highly experienced in scoring road crossing behaviour).
CHAPTER 5
IMPLEMENTATION FINDINGS

The following is a summary of the key findings as a result of gathering data from the implementation of the three learning sequences in the “Walking safely” component of the year 2 section of Book 1. The information was collected through direct observations, photographs, student work, work completed as part of the take-home program and documentation provided by the teachers.

Each learning sequence contains the following information for teachers to assist with implementation:

- road safety information related to the learning sequences
- a purpose
- specific objectives
- preparation information
- teaching points - explaining the key safety issues and teaching strategies to employ or ideas about how best to implement the learning sequence
- a “tuning in” section - which provides activities to help students tune in to the focus of the lesson and to enable the teacher to ascertain relevant student understandings
- an “investigation” section - which provides activities to actively engage students in exploring and developing skills and knowledge within real world settings
- a “reflecting” section which provides opportunities for students to think about
the tasks they have undertaken and to reflect on and synthesise their learning in
order to form generalisations about safety issues

- a “further ideas” section which provides opportunities for developing cross-
curricular activities to extend and enhance the learning that has taken place.

The take-home activities in *RoadSmart* have been designed to involve parents/carers in
the road safety education of their children. They complement the school based activities
described in the learning sequences. On average there are approximately two take-home
activities for every three learning sequences. It is acknowledged in the resource that
parents and carers are best placed to teach road safety to children. Their expectations
will shape the behaviour of the child and the knowledge they impart will be the basis for
the decisions the child will make as a road user in the future. While parents/carers wish
well for their children, they may lack knowledge of safety practices and be unaware of
the road safety behaviour they can expect from children of different ages. On the other
hand, schools and teachers are unable to devote the amount of time required for children
to experience the real traffic situations they need in order to develop the necessary safety
skills and knowledge. The take-home activities address both of these issues. Each
activity contains:

- an explanation of what the activity is intended to do, a page for parents/carers
  which includes safety issues and instructions for the activity.
- a record sheet for both parent/carers and child to complete.
The take-home activity program is supported by a take-home folder to encourage open communication between home and school about student learning. Students can use the folder to carry the activities between school and home, and it is intended that parents/carers be encouraged to complete the feedback sections after each activity. An introductory letter is provided for teachers to send to parents/carers before the first take-home activity. This letter was sent home to parents prior to the implementation of the RoadSmart program.

Class observations were recorded using pen and paper and transcripts were typed up directly after (Appendix A). Implementation characteristics were identified from the RoadSmart materials that were provided to the teachers. The implementation characteristics were ranked as being essential to the program (***) in achieving the desired behavioural outcomes or as an important (*) part of the philosophy of the program in establishing what children's understandings are or in order to add new constructs to their understandings. The implementation characteristics marked "***" were those characteristics identified in previous research as important pre-cursors to the development of positive road safety behaviour. In summary, it is considered essential for students to have the right kinds of practical experience in the real-street environment for any significant positive behavioural change to occur. It is also highly desirable for children to have the opportunity to work in smaller groups with an adult to supervise, facilitate discussions, guide and teach the children.

All other characteristics were considered desirable and help to ascertain the extent of
implementation. The observations (what actually happened) were then matched up with implementation characteristics. These are summarised in Tables 4, 6 and 7 for each of the three learning sequences taught by the teachers. No parental assistance was gained for the school-based components of the learning sequences. The children worked as one large group for the majority of time, the observer also assisted at times as an additional supervisor, however there was never any opportunity for small group work in the real-street environment.

5.1 LEARNING SEQUENCE 1: FOOTPATH HAZARDS

Table 4 indicates that as a result of observations, of the three stated objectives for this learning sequence, two were considered to have been achieved and one partially achieved. During the class walks in the real-street environment, students were able to identify what makes a footpath safe or unsafe, and to formulate strategies for dealing with unsafe situations. These are discussed in further detail in section 5.1.2 “Investigating”. While students had opportunities to practise the Stop, Look, Listen, Think strategy while crossing driveways, they were not observed crossing roads as suggested in the learning sequence.

5.1.1 Tuning In

Most children participated in the class discussion regarding "footpath hazards". For class 2A the concept of "hazards" was discussed as a "danger". Class 2B used some Discussion posters to introduce "what we might have to look out for" when walking on
footpaths.

**Table 3. Footpath hazards as listed by the classes**

<table>
<thead>
<tr>
<th>CLASS 2A</th>
<th>CLASS 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>driveways</td>
<td>cars</td>
</tr>
<tr>
<td>road</td>
<td>bikes</td>
</tr>
<tr>
<td>behind a car</td>
<td>cracks in the footpath</td>
</tr>
<tr>
<td>building site</td>
<td>water</td>
</tr>
<tr>
<td>piles of sand, bricks, rocks</td>
<td>strangers</td>
</tr>
<tr>
<td>corners</td>
<td>stones/ gravel</td>
</tr>
<tr>
<td>bikes</td>
<td>driveways - cars backing out</td>
</tr>
<tr>
<td>postperson</td>
<td>dips</td>
</tr>
<tr>
<td>bumpy footpaths</td>
<td></td>
</tr>
<tr>
<td>working - new footpaths</td>
<td></td>
</tr>
<tr>
<td>Lesson Component</td>
<td>Implementation Characteristics</td>
</tr>
<tr>
<td>------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Purpose</td>
<td>To examine some pedestrian safety issues related to footpaths in the local area.</td>
</tr>
<tr>
<td>Objectives</td>
<td>This learning sequence will help students to:</td>
</tr>
<tr>
<td></td>
<td>identify what makes a footpath safe or unsafe</td>
</tr>
<tr>
<td></td>
<td>formulate strategies for dealing with unsafe footpaths</td>
</tr>
<tr>
<td></td>
<td>demonstrate safe pedestrian behaviour</td>
</tr>
<tr>
<td>Tuning in</td>
<td>* Class discussion re: hazards/features students might encounter on local footpaths</td>
</tr>
<tr>
<td></td>
<td>Teacher listing student predictions on board</td>
</tr>
<tr>
<td></td>
<td>* Class discussion: why the hazards listed might be dangerous</td>
</tr>
<tr>
<td></td>
<td>Introduce Blackline master (BLM) 1</td>
</tr>
<tr>
<td>Investigating</td>
<td>** Parental assistance</td>
</tr>
<tr>
<td>** Part A</td>
<td>** Class observation walk</td>
</tr>
<tr>
<td></td>
<td>** Students working in pairs filling out the BLM</td>
</tr>
<tr>
<td></td>
<td>• note anything that obscures vision</td>
</tr>
<tr>
<td></td>
<td>• discuss why these could be dangerous</td>
</tr>
</tbody>
</table>

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<table>
<thead>
<tr>
<th>Lesson Component</th>
<th>Implementation Characteristics</th>
<th>Class 2A</th>
<th>Class 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Take photographs of footpath hazards, for later use in the classroom</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>** Formulate strategies for dealing with hazards</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>** Practise strategies for dealing with hazards</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>** Practise the Stop, Look, Listen, Think (SLLT) procedure when crossing roads</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*Class discussion as BLM observation notes are compared to predictions on the board</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Part B: Classroom follow-up</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflecting</td>
<td>* Small group work</td>
<td>✓ pairs</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>* Discussions</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Create a class book and wall display using the photographs of footpath hazards.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Introduce and explain Take-home activity (THA) Neighbourhood explorer.</td>
<td>✓</td>
<td>✓ not observed</td>
</tr>
<tr>
<td></td>
<td>Discussion poster 1: Rural pedestrians</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Discussion poster 2: Driveway hazards</td>
<td>x</td>
<td>✓</td>
</tr>
<tr>
<td>Take-home activity 1</td>
<td>** Neighbourhood explorer record sheet completed</td>
<td>67%</td>
<td>85%</td>
</tr>
</tbody>
</table>

*RoadSmart - An Evaluation*
5.1.2 Investigating

While the students in both classes did not use the Blackline master to record hazards encountered on the walk, they had jotters to record information on. The Blackline master was not introduced to either class prior to the walk, students were not entirely clear of the purpose of the walk. Both teachers emphasised that the purpose of the walk was to look out for potential hazards on the footpath, however one teacher said "today we won't be crossing any roads, we'll only be looking at them". While this is not inaccurate it means that the teacher actively chose not to have children crossing any roads. In the RoadSmart materials one dot point in the 'investigating' section states "Practise the Stop, Listen, Listen and Think procedure when crossing roads. Use controlled crossings where possible." Therefore, for this lesson an essential element was missed in both classes.

During the walk a number of hazards were encountered. For example, Class 2B noticed a high pile of bricks on the opposite side of the road near a driveway. The teacher took a student across the road, using this as an opportunity to demonstrate the Stop, Look and Listen procedure (no mention of "think" at this stage). The student walked behind the pile of bricks, while the other students tried to see her (Figures 6.1 and 6.2). This led to a discussion about a scenario where a car might back out of the driveway. Would the driver be able to see the child? Strategies were discussed, however, not practised.

Around the corner, gravel had just been freshly laid on the road. There was a sign
warning drivers of the loose gravel (Figure 7). The class discussed how this could be a hazard. Reasons given included; "a car might skid", "gravel might fly up", "keep away from the road so as not to get hurt". Other footpath hazards observed and discussed were cracks in the footpath ("might trip up", "could be a problem for bike riders") and driveways.

Figure 6.1. Obstacles on footpaths which can obscure drivers' vision of small children and children's vision of approaching vehicles.
Figure 6.2. Obstacles on footpaths which can obscure drivers' vision of small children and children's vision of approaching vehicles.

Figure 7. Road signs to warn of potential dangers
Discussions regarding driveways emphasised potential hazards particularly when vision is obscured by fences, shrubs or letterboxes (Figure 8). The teacher introduced "Think" to the Stop, Look and Listen procedure the children had already established in class. The class discussed the following:

- What to look for - drivers in cars, exhaust emission, cars leaving or entering driveways
- What to listen for - reversing signals, engine sounds
- What they need to think about before crossing driveways? Is there a car entering or leaving the driveway?

Figure 8. Children discussing potential hazards particularly when vision of driveways is obscured by fences, shrubs or letterboxes
Children in both classes practised the Stop, Look, Listen, Think procedure as they walked across driveways in pairs. There were a number of children who did not look for the possibility of cars entering the driveway from the road without being reminded. A number of children kept walking while looking. However, they did not practise crossing any roads.

On returning to the classroom, children added to the classroom list of footpath hazards. These are listed in Table 5 (italics).

Table 5. Additional footpath hazards as listed by the classes

<table>
<thead>
<tr>
<th>CLASS 2A</th>
<th>CLASS 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>driveways</td>
<td>letter boxes</td>
</tr>
<tr>
<td>road</td>
<td>high fences</td>
</tr>
<tr>
<td>behind a car</td>
<td>big bushes</td>
</tr>
<tr>
<td>building site</td>
<td>gates</td>
</tr>
<tr>
<td>piles of sand, bricks,</td>
<td>building bricks</td>
</tr>
<tr>
<td>rocks</td>
<td></td>
</tr>
<tr>
<td>corners</td>
<td></td>
</tr>
<tr>
<td>bikes</td>
<td></td>
</tr>
<tr>
<td>postperson</td>
<td></td>
</tr>
<tr>
<td>bumpy footpaths</td>
<td></td>
</tr>
<tr>
<td>working - new footpaths</td>
<td></td>
</tr>
<tr>
<td>glass</td>
<td></td>
</tr>
<tr>
<td>branches</td>
<td></td>
</tr>
<tr>
<td>plants</td>
<td></td>
</tr>
<tr>
<td>fences</td>
<td></td>
</tr>
<tr>
<td>dogs</td>
<td></td>
</tr>
<tr>
<td>prickles</td>
<td></td>
</tr>
<tr>
<td>cars</td>
<td></td>
</tr>
<tr>
<td>bikes</td>
<td></td>
</tr>
<tr>
<td>cracks in the footpath</td>
<td></td>
</tr>
<tr>
<td>water</td>
<td></td>
</tr>
<tr>
<td>strangers</td>
<td></td>
</tr>
<tr>
<td>stones/ gravel</td>
<td></td>
</tr>
<tr>
<td>driveways - cars</td>
<td></td>
</tr>
<tr>
<td>backing out</td>
<td></td>
</tr>
<tr>
<td>dips</td>
<td></td>
</tr>
</tbody>
</table>
5.1.3 Reflecting

This section was implemented, however the teachers chose to use different sized groups than suggested. As photographs were not taken during the walk, a class book or display wall was not created.

5.2 LEARNING SEQUENCE 2: CLEVER CROSSING

Table 6 shows that of the two stated behavioural objectives, only one was partially attained by one class. During the time observed, students did not demonstrate the safe use of the school crossing under adult supervision nor did they demonstrate safe crossing procedures at marked crossing points under adult supervision. Students from class 2A did, however practise crossing the road at an unmarked location. Table 9 shows that both classes spent additional time to that observed as part of the lesson sequence.
<table>
<thead>
<tr>
<th>Lesson Component</th>
<th>Implementation Characteristics</th>
<th>Class 2A</th>
<th>Class 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Purpose</td>
<td>To develop an awareness of safer locations to cross roads in the local area.</td>
<td>Achieved?</td>
<td>Achieved?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Partially</td>
<td>Partially</td>
</tr>
<tr>
<td>Objectives</td>
<td>This learning sequence will help students to:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>*demonstrate the safe use of the school crossing under adult supervision</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>*demonstrate safe crossing procedures at marked and unmarked crossing points under adult supervision</td>
<td>partially</td>
<td>(unmarked points)</td>
</tr>
<tr>
<td></td>
<td>*identify factors that affect seeing and being seen</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Tuning in</td>
<td>*Small group discussion re: things that make road crossings difficult for them and record on part A of BLM 2: Clever Crossing.</td>
<td>15 minutes</td>
<td>55 minutes</td>
</tr>
<tr>
<td></td>
<td></td>
<td>✓ as a class</td>
<td>✓ as a class</td>
</tr>
<tr>
<td></td>
<td>Groups reporting to the rest of the class.</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Teacher lists group responses on chart “Road Crossing Difficulties”</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>*Discuss past experiences students may have had with difficult crossings</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Investigating</td>
<td>**Parental assistance</td>
<td>35 minutes</td>
<td>20 minutes</td>
</tr>
<tr>
<td></td>
<td>**Class observation walk to identify safe crossing places.</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>**Class observation walk to identify unsafe crossing places.</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Table 6. Learning Sequence 2: Clever Crossing
<table>
<thead>
<tr>
<th>Lesson Component</th>
<th>Implementation Characteristics</th>
<th>Class 2A</th>
<th>Class 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Photographs taken</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><strong>Small groups of students crossing the road at pedestrian crossings under adult supervision.</strong></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>Crossing at an unmarked, mid-block location</strong></td>
<td>✓</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><em>Video students crossing the roads</em></td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Reflecting</td>
<td><em>View the video</em></td>
<td>35 minutes</td>
<td>10 minutes</td>
</tr>
<tr>
<td></td>
<td>Discussions</td>
<td>✓</td>
<td>✓ continued on part A</td>
</tr>
<tr>
<td></td>
<td><em>Students working in pairs/small groups to complete BLM (part B).</em></td>
<td>✓</td>
<td>x</td>
</tr>
<tr>
<td></td>
<td>Introduce and explain THA &quot;Easy to see or hard to miss&quot;.</td>
<td>✓ not observed</td>
<td>✓ not observed</td>
</tr>
<tr>
<td></td>
<td>Discussion poster 3: Choosing a Safe Place to Cross</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Discussion poster 6: Crossing at a Pedestrian Refuge</td>
<td>x</td>
<td>✓ other Discussion posters were used</td>
</tr>
<tr>
<td>Take-home activity 2</td>
<td>survey sheet completed</td>
<td>74% returned</td>
<td>86% returned</td>
</tr>
</tbody>
</table>
5.2.1 Tuning In

Class 2B spent half an hour using some Discussion posters (enlarged road safety photographs) to discuss safe and unsafe places to cross the road. Both classes listed things that can make crossing the road difficult for them (Figure 9).

![Classroom scene with students and a blackboard](image)

**Figure 9.** Class list of things that can make crossing the road difficult

5.2.2 Investigating

No parents were present to assist with the investigation carried out in the real street environment. Both classes observed a pedestrian crossing at a signalised pedestrian crossing (Figure 10) and discussed whether selected crossing points would be safe or
unsafe places to cross the road. Students used the location shown in Figure 11.1 to discuss why the selected location would be unsafe to cross the road. They point out that the dip in the road makes it difficult for them to see approaching vehicles and for the drivers to see them. The fact that it is relatively close to a pedestrian crossing and drivers would be expecting to see pedestrians crossing at the crossing, not next to it was also discussed. Figure 11.2 shows students discussing the dangers of crossing near parked cars and large vegetation, blocking their view of the traffic and drivers' view of them.

Figure 10. Children observing a young adult crossing the road at a signalised pedestrian crossing.
Figure 11.1  Children discussed why this would be an unsafe place to cross the road

Figure 11.2  Children discussing why it is an unsafe to cross the road near parked vehicles
Figure 12.1  After selecting a safe place to cross the road mid-block children practised crossing road in pairs.

Figure 12.2  After selecting a safe place to cross the road mid-block children practised crossing in pairs.
Figure 12.3  After selecting a safe place to cross the road mid-block children practised crossing in pairs.

Only children in class 2A crossed the road in pairs at a safe mid-block location while other class members watched the crossing pair and provided feedback. This is depicted in Figures 12.1 to 12.3. While children in class 2B also practised crossing the road, this was not observed, rather reported by the teacher.
5.2.3 Reflecting

Class 2A completed part B of the Blackline master "If there is no crossing, list all the things you could do to make sure you crossed the road safely". Students' written answers as recorded included:

"be with an adult"
"stop, look, listen, think"
"make sure that your not near a corner"
"don't cross behind a tree"
"Chos a safe place".

One child responded:
"1. Stop for any cars.
2. Look for a cars
3. Hear any cars comeing.
4. Think if you can go"

5.3 LEARNING SEQUENCE 3: WHAT WILL I SAY? WHAT WILL I DO?

Only one class was observed. The teacher from the other class provided details as to what was covered for her class. This learning sequence builds on the childrens' experience in the traffic environment and presents a number of scenarios which need to
be considered. While children are required to formulate strategies to deal with unsafe situations, the objectives for this learning sequence are cognitive based and not behavioural objectives.

Figure 13. Children role playing scenarios.
<table>
<thead>
<tr>
<th>Lesson Component</th>
<th>Implementation Characteristics</th>
<th>Class 2A</th>
<th>Class 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose</strong></td>
<td><em>To encourage students to begin to take some responsibility for their own safety in traffic.</em></td>
<td>Achieved? (teachers' opinion-Yes)</td>
<td>Achieved? Yes</td>
</tr>
<tr>
<td><strong>Objectives</strong></td>
<td><em>This learning sequence will help students to:</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>explain how their behaviour may affect the safety of others</em></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td><em>identify situations that may make road crossings difficult</em></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td><em>formulate strategies to deal with unsafe situations</em></td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td><strong>Tuning in</strong></td>
<td>Class discussion re: times when students have done something they really didn’t want to do, but went along with</td>
<td>20 minutes</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>How did they feel and why?</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Discuss times when students have felt unsafe and how it made them feel</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Teacher lists the types of feelings on the board</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Teacher lists students’ suggested strategies</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><strong>Investigating</strong></td>
<td>Teacher reads one scenario card. Complete as a class. Teacher lists all responses</td>
<td>40 minutes</td>
<td>✓</td>
</tr>
<tr>
<td></td>
<td>Encourage the students to keep thinking until a successful strategy is reached</td>
<td></td>
<td>✓</td>
</tr>
<tr>
<td>Lesson Component</td>
<td>Implementation Characteristics</td>
<td>Class 2A</td>
<td>Class 2B</td>
</tr>
<tr>
<td>------------------</td>
<td>-------------------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>Small group activity - discuss “make you think” cards and formulate strategies to solve the dilemmas</td>
<td></td>
<td>✓ role plays</td>
</tr>
<tr>
<td></td>
<td>Class - share the strategies devised in small groups and discuss</td>
<td>✓</td>
<td></td>
</tr>
<tr>
<td>Reflecting</td>
<td>List useful strategies for later reflection</td>
<td></td>
<td>✗</td>
</tr>
<tr>
<td></td>
<td>Individual student writing task - a dilemma from their own experience describing the situation, what they did and what happened.</td>
<td></td>
<td>✗</td>
</tr>
</tbody>
</table>

5.3.1 Tuning In

This part of the lesson was implemented according to the materials with the exception of recording the types of feelings students identified when they may have felt unsafe.

5.3.2 Investigating

Students from class 2B role played their scenarios (Figure 13), demonstrating the strategies they had formulated for safer road user behaviour. These were presented to the class and discussed. This demonstrated a slight modification to the way the material was taught, however, the intended information was covered and this was considered a positive modification.
5.3.3 Reflecting

This section of the lesson sequence was not implemented.

5.4 GENERAL OVERVIEW

The observations support the fact that generally, implementation of the RoadSmart materials actually occurred. However the teachers did not implement all activities provided in the individual learning sequences. In some instances, while students participated in the activities, the activities were not implemented in the intended manner. For example it was intended that additional adult helpers be arranged and briefed to assist with the walks to facilitate group discussions and practice, particularly while the children select safe crossing places and practise the road crossing task at a variety of locations. By securing the assistance of parents/carers, children can be provided with more opportunities for practising road safety skills in the real-street environment.

Further to this, children could have greater access to adult assistance and discussion. While parents/carers were not involved in the school based activities, a large proportion were involved via the take-home activity component of the learning sequences. This issue and possible implications are discussed in greater detail in Chapter 7: "Discussion of Findings".
5.4.1 Take-home Activities

The take-home activities encourage parent/carers to partake in activities with their child.

The task for take-home activity 1: “Neighbourhood explorer” was:

Draw and label a map of the route you walk to one of these places: your school, the local park, the nearest shop, your friend’s house, or [your choice]. Show any pedestrian crossings, traffic lights, difficult crossing places, street names, shops and important places you pass on the way.

The activity encourages parents/carers to:

- plan the route with their child
- take a pencil and paper on the walk and record the features required on the map
- observe their child’s pedestrian behaviour, particularly the Stop, Look, Listen, Think procedure
- encourage their child’s responsible behaviour at all times
- discuss any hazards and help the child work out strategies to deal with them and to practise these strategies with their child.

Take-home activity 2: “Easy to see or hard to miss” encourages parents/carers to discuss with their child, the importance of being easily seen when in the traffic environment.

A record sheet allows the child to record and explain their observations about how easy or difficult it is to see various people in the traffic environment, for example; someone in dark coloured clothes, a road worker, someone on a pedestrian crossing, someone standing between parked cars.

The return response rate of the take-home activities was fairly high, with 75% of the
first take-home activity being returned and 80% of the second activity (Table 8). This does not however, measure the level or type of involvement of parents/carers with their children. Nor was the time spent supervising their children crossing roads outside the school day recorded. It could be assumed, however, that those children who returned completed take-home activities (particularly the first one, Neighbourhood explorer) had some additional one-to-one experience with an adult while crossing roads in their local environment.

5.4.2 Proportion of Teaching Time

Table 9 shows the proportion of time spent in the classroom and in the real street environment. Class 2A spent 36.9% of total teaching time in the real street environment (one and a half hours), and class 2B spent 33% of their total time in the real street environment (four hours and forty-five minutes). Only learning sequences 1 and 2 required time for the children to practise crossing roads in the real street environment. Therefore, the total teaching time spent in the real street environment over the first two learning sequences for class 2A was 39% and for class 2B was 35% of the total teaching time. However, class 2B spent over three times more time teaching to the RoadSmart program than class 2A. Most of this additional time was absorbed in classroom teaching (9.5 hours). While the time spent in the real-street environment for class 2B exceeded that spent by class 2A, little of that time was spent actually practising crossing the roads. Most time was spent observing adult pedestrians crossing the road, distinguishing between safe and unsafe crossing points, identifying potential hazards, working out strategies to deal with them and extensions to the activities presented in RoadSmart.
Table 8  Proportion of Take-home activities completed

<table>
<thead>
<tr>
<th>Take-home activity</th>
<th>% returned</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Neighbourhood explorer</td>
<td>75</td>
</tr>
<tr>
<td>2. Easy to see or hard to miss</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 9  Proportion of time spent in the classroom and in the street environment

<table>
<thead>
<tr>
<th>Class</th>
<th>Learning sequence</th>
<th>Hours street</th>
<th>Hours classroom</th>
<th>Total no. of hours</th>
<th>% time in real street</th>
<th>% time in classroom</th>
</tr>
</thead>
<tbody>
<tr>
<td>2A</td>
<td>1</td>
<td>.5</td>
<td>.75</td>
<td>1.25</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>.5</td>
<td>.83</td>
<td>1.33</td>
<td>37.6%</td>
<td>62.4%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>.83</td>
<td>.83</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Additional</td>
<td>.5</td>
<td>.16</td>
<td>.66</td>
<td>75.8%</td>
<td>24.2%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>1.5</td>
<td>2.57</td>
<td>4.07</td>
<td>36.9%</td>
<td>63.1%</td>
</tr>
<tr>
<td>2B</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>4</td>
<td>25%</td>
<td>75%</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>2.75</td>
<td>4</td>
<td>6.75</td>
<td>41%</td>
<td>59%</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Additional</td>
<td>1</td>
<td>1.5</td>
<td>2.5</td>
<td>40%</td>
<td>60%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>4.75</td>
<td>9.5</td>
<td>14.25</td>
<td>33%</td>
<td>67%</td>
</tr>
<tr>
<td>2A &amp; 2B Combined totals</td>
<td>6.25</td>
<td>12.07</td>
<td>18.32</td>
<td>34.1%</td>
<td>65.9%</td>
<td></td>
</tr>
</tbody>
</table>
Figure 14.  Children completing a Blackline master in groups
CHAPTER 6
OUTCOME FINDINGS
ROAD CROSSING BEHAVIOUR

This chapter provides a summary of the outcome findings related to child road crossing behaviour. This is only a component of the sixth intermediate objective of the RoadSmart program (Figure 2: Objectives hierarchy for RoadSmart).

To develop and foster behaviour change in children conducive to safe and responsible traffic practices.

In the "Walking safely" section of the Year 2 program, one of the stated objectives is that the learning sequence will:

help students to demonstrate safe crossing procedures under adult supervision.

Data were collected by unobtrusive observations which were filmed and later scored for key road crossing behavioural characteristics. Unobtrusive observations were undertaken both before and after the implementation of RoadSmart and statistical comparisons made of the road crossing task performed by seven year old children.
6.1 THE ROAD CROSSING TASK

The road crossing task, developed by Older and Grayson, (1974; cited in Struik et al., 1988) comprises the following steps:

1. Location selection
2. Observation (the only observable process) - the overt search behaviour carried out by the pedestrian, head movements.
3. Perception - the processing of visual and auditory senses. It is most likely that children have greater difficulty in accurately perceiving their environment.
4. Judgement - this involves utilising the information already processed to make decisions about speed, distance, time and gap estimation. If the previous stages of perception or observation are not accurate, then the judgement will be based on insufficient or inaccurate information.
5. The decision - when to cross the road is the culmination of the four previous stages. If the decision is not to cross, the sequence will begin again.
6. Road crossing - the act of physically crossing the road.

"Observation - movement of the head" was the key characteristic measured in this evaluation. Two stages of the road crossing task were identified to be scored. These are consistent with definitions used by Penna (1994) and Oxley et al., (1996).
**Kerb stage**: this is defined as the time from when a child stops to assess the traffic from the road side kerb to the time of the first step forward to cross the road.

**Road crossing**: this is defined as the time from the first step forward to cross the road to the kerb zone of the opposite side of the road.

### 6.2 STATISTICAL TESTS

Two tailed paired t-tests and Wilcoxon matched-pair signed-ranks tests were performed on the mean differences between pre and post scores to test for significant differences. The paired t-test was appropriate because the same students were tested pre and post. The test was of the null hypothesis that the true mean difference is zero, against the alternative hypothesis that it is not (that is a two sided alternative). However as the two populations (pre and post) were not normally distributed, the Wilcoxon test was the more appropriate statistical test to perform.

The Wilcoxon test was relevant because it does not assume normality and operates on the rank of the differences. This non-parametric test is used when the data are quite skewed as it was in this case where there were a large number of "zeros" in the pre-observation data, particularly while the children were at the kerb. This was because many of the children did not look prior to crossing the road or while crossing the road during the pre-observations. The aim of this test was to compare the performance of each child on two occasions and find whether there were significant differences between the scores.
It is common convention to adopt levels of significance of either 0.05 or 0.01. That is, the chances are 5 (or 1) in 100, or less, that the difference could result when the "treatment" applied is having no effect (Ferguson, 1976). In most instances this evaluation adopted a level of significance at the 5% level (p≤0.05) and quite often, findings were significant to the 1% level (p≤0.01).

6.3 TOTAL TIMES SPENT DURING THE ROAD CROSSING TASK

Total times spent and proportions of total times spent in each phase of the road crossing task (at the kerb and during the road cross) were scored for each child and average times calculated for both the pre observations and post observations. The Wilcoxon matched-pair signed-ranks statistical test was performed on the differences of the means to determine the level of significance where applicable.

<table>
<thead>
<tr>
<th></th>
<th>Stopping Time at Kerb (seconds)</th>
<th>Proportion of total time</th>
<th>Road Crossing Time (seconds)</th>
<th>Proportion of total time</th>
<th>Total (seconds)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-observations</td>
<td>.63s</td>
<td>10%</td>
<td>5.41s</td>
<td>90%</td>
<td>6.04s</td>
</tr>
<tr>
<td>Post-observations</td>
<td>2.84s</td>
<td>36%</td>
<td>5.14s</td>
<td>64%</td>
<td>7.98s</td>
</tr>
</tbody>
</table>

While the time to cross the road did not vary much, the time students spent waiting at the kerb prior to crossing increased significantly at the acceptance level of a chance
probability of less than .01 (mean of the difference=2.216, SD=3.099, p=0.0000). Children spent little time waiting at the kerb during the pre-observations as compared to post observations at the kerb, (Table 10). During the pre-observations, many of the children observed walked directly from the kerb to the road without stopping to check the traffic first, hence a large number of “zeros” were scored for these observations. Only 25% of the children observed prior to the teaching of the RoadSmart materials stopped at the kerb before crossing the road, whereas during post observations, 73% of children stopped at the kerb prior to crossing. The variance was therefore quite different for the pre-scores as compared to the post-scores and did not assume normality. Figures 15.1 and 15.2 graphically represent matched student pre and post stopping times while at the kerb.

**Figure 15.1** Matched pre and post stopping times at the kerb for class 2A
Figure 15.2  Matched pre and post stopping times at the kerb for class 2B

6.4 DIRECTIONAL LOOKING BEHAVIOUR DURING THE ROAD CROSSING TASK

A number of looking behaviours as total times spent and proportions of total times spent in each phase of the road crossing task were scored for all children. The looking behaviours scored are based on those defined by Oxley et al., (1995). "Near-side traffic" was defined as cars approaching from the near-side of the road, that is traffic from the right (from the perspective of the pedestrians); while "far-side traffic" was defined as cars approaching from the far-side of the road, that is traffic from the left (again from the pedestrian's perspective). "Looking at other" included any looking behaviour not including looking at the traffic, ahead or the ground. It included such behaviour as looking at other people or behind them.
6.4.1 Total Looking Times at the kerb

The total looking times for near-side and far-side traffic and looking ahead whilst at the kerb are graphically presented in Figures 16.1 to 16.6. These pre and post times are matched for individuals. Times spent looking ahead and at the ground did not change significantly (Table 11), while times spent looking for near-side and far-side traffic and looking ahead did increase significantly at the 0.01 level. The results indicate that if a child stops at the kerb, he/she is more likely to spend time looking for traffic before commencing to cross the road, which is consistent with previous research findings.

![Near-side: Class 2A](image)

**Figure 16.1** Time spent looking for near-side traffic - at the kerb, Class 2A
Figure 16.2  Time spent looking for near-side traffic - at the kerb, Class 2B

Figure 16.3  Time spent looking for far-side traffic - at the kerb, Class 2A
Figure 16.4  Time spent looking for far-side traffic - at the kerb, Class 2B

Figure 16.5  Time spent looking ahead - at the kerb, Class 2A
Figure 16.6  Time spent looking ahead - at the kerb, Class 2B

Table 11  Statistical tests of significance on the difference of the means between pre and post scores for total directional looking times at the kerb (N=44)

* denotes significant results, p≤0.05

<table>
<thead>
<tr>
<th>Variable</th>
<th>Diff. of the means</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
<th>Wilcoxon statistic</th>
<th>Wilcoxon P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-side</td>
<td>1.080</td>
<td>1.967</td>
<td>3.64</td>
<td>0.0007*</td>
<td>365.0</td>
<td>0.000*</td>
</tr>
<tr>
<td>Far-side</td>
<td>0.716</td>
<td>1.451</td>
<td>3.27</td>
<td>0.0021*</td>
<td>359.5</td>
<td>0.000*</td>
</tr>
<tr>
<td>Ahead</td>
<td>0.262</td>
<td>0.900</td>
<td>1.93</td>
<td>0.060</td>
<td>190.5</td>
<td>0.010*</td>
</tr>
<tr>
<td>Ground</td>
<td>0.174</td>
<td>0.753</td>
<td>1.53</td>
<td>0.13</td>
<td>72.0</td>
<td>0.069</td>
</tr>
<tr>
<td>Other</td>
<td>-0.002</td>
<td>0.242</td>
<td>-0.05</td>
<td>0.96</td>
<td>1.0</td>
<td>1.000</td>
</tr>
</tbody>
</table>
6.4.2 Total Looking Times While Crossing the Road

The total looking times for near-side and far-side traffic and looking ahead while crossing the road are graphically presented in Figures 17.1 to 17.4. Results indicate that during the road cross time spent looking at near-side and far-side traffic significantly increased in the post observations, while time spent looking ahead and "at other" significantly decreased (Table 12).

![Near-side: Class 2A](image)

**Figure 17.1** Time spent looking for near-side traffic while crossing the road, Class 2A
Figure 17.2  Time spent looking for near-side traffic while crossing the road, Class 2B

Figure 17.3  Time spent looking for far-side traffic while crossing the road, Class 2A
Figure 17.4  Time spent looking for far-side traffic while crossing the road, Class 2B

Table 12  Statistical tests of significance on the difference of the means between pre and post scores for total directional looking times during the road cross (N=45) * denotes significant results, $p<0.05$

<table>
<thead>
<tr>
<th>Variable</th>
<th>Diff. of means</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
<th>Wilcoxon statistic</th>
<th>Wilcoxon P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-side</td>
<td>0.813</td>
<td>1.556</td>
<td>3.51</td>
<td>0.0011*</td>
<td>618.0</td>
<td>0.001*</td>
</tr>
<tr>
<td>Far-side</td>
<td>0.366</td>
<td>1.432</td>
<td>1.71</td>
<td>0.094</td>
<td>706.5</td>
<td>0.014*</td>
</tr>
<tr>
<td>Ahead</td>
<td>-0.971</td>
<td>1.789</td>
<td>-3.64</td>
<td>0.0007*</td>
<td>222.5</td>
<td>0.001*</td>
</tr>
<tr>
<td>Ground</td>
<td>0.012</td>
<td>1.638</td>
<td>0.05</td>
<td>0.96</td>
<td>485.5</td>
<td>0.885</td>
</tr>
<tr>
<td>Other</td>
<td>-0.492</td>
<td>1.113</td>
<td>-2.96</td>
<td>0.0049*</td>
<td>11.5</td>
<td>0.006*</td>
</tr>
</tbody>
</table>
6.4.3 Proportion of Directional Looking Times at the Kerb

The proportion of total times spent looking for near-side and far-side traffic, looking ahead and at the ground or at other are presented graphically in Figure 18. The proportion of times spent looking for near-side and far-side traffic and looking ahead all increased significantly ($p \leq 0.01$) during post observations as compared to pre observation scores (Table 13). There was less time spent looking at the ground and "other".

Table 13 Statistical tests of significance on the difference of the means between pre and post scores for the proportion of total directional looking times at the kerb. (N=44) * denotes significant results, $p \leq 0.05$

<table>
<thead>
<tr>
<th>Variable % time</th>
<th>Difference of the means</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
<th>Wilcoxon statistic</th>
<th>Wilcoxon P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-side</td>
<td>23.016</td>
<td>41.262</td>
<td>3.70</td>
<td>0.0006*</td>
<td>348.0</td>
<td>0.001*</td>
</tr>
<tr>
<td>Far-side</td>
<td>14.810</td>
<td>40.335</td>
<td>2.44</td>
<td>0.019*</td>
<td>359.5</td>
<td>0.000*</td>
</tr>
<tr>
<td>Ahead</td>
<td>6.115</td>
<td>17.708</td>
<td>2.29</td>
<td>0.027*</td>
<td>192.0</td>
<td>0.008*</td>
</tr>
<tr>
<td>Ground</td>
<td>5.228</td>
<td>23.334</td>
<td>1.49</td>
<td>0.14</td>
<td>73.0</td>
<td>0.059</td>
</tr>
<tr>
<td>Other</td>
<td>-0.569</td>
<td>2.855</td>
<td>-1.32</td>
<td>0.19</td>
<td>0.0</td>
<td>0.371</td>
</tr>
</tbody>
</table>
Figure 18  Proportion of total times spent looking for near-side and far-side traffic, looking ahead, at the ground and at other places while at the kerb

6.4.4 Proportion of Directional Looking Times During the Road Cross

The proportion of total times spent looking for near-side and far-side traffic, looking ahead and at the ground or at other are presented graphically in Figure 19. The proportion of time spent looking for near-side traffic increased significantly ($p \leq 0.01$). The proportion of time spent looking for far-side traffic also increased significantly, however not as significantly as for near-side looking time ($p \leq 0.05$). The proportion of time spent looking ahead and at "other" decreased significantly ($p \leq 0.01$) during post observations as compared to pre observation scores during the road cross (Table 14). This suggests that children are spending more time making meaningful searches for traffic while crossing the road.

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Table 14  Statistical tests of significance on the difference of the means between pre and post scores for the proportion of total directional looking times during the road cross. (N=45) * denotes significant results, p≤0.05

<table>
<thead>
<tr>
<th>Variable</th>
<th>Difference of the means</th>
<th>SD</th>
<th>T value</th>
<th>P value</th>
<th>Wilcoxon statistic</th>
<th>Wilcoxon P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Near-side</td>
<td>16.430</td>
<td>26.541</td>
<td>4.15</td>
<td>0.0001*</td>
<td>648.5</td>
<td>0.000*</td>
</tr>
<tr>
<td>Far-side</td>
<td>8.095</td>
<td>23.690</td>
<td>2.29</td>
<td>0.027*</td>
<td>701.0</td>
<td>0.016*</td>
</tr>
<tr>
<td>Ahead</td>
<td>-16.750</td>
<td>33.965</td>
<td>-3.31</td>
<td>0.0019*</td>
<td>235.5</td>
<td>0.001*</td>
</tr>
<tr>
<td>Ground</td>
<td>0.725</td>
<td>32.923</td>
<td>0.15</td>
<td>0.88</td>
<td>494.0</td>
<td>0.804</td>
</tr>
<tr>
<td>Other</td>
<td>-8.498</td>
<td>19.431</td>
<td>-2.93</td>
<td>0.0053*</td>
<td>6.0</td>
<td>0.002*</td>
</tr>
</tbody>
</table>

Figure 19  Proportion of total times spent looking for near-side and far-side traffic, looking ahead, at the ground and at other places during the road cross
6.5 HEAD TURNS

The frequency of head movements were scored at the kerb and during the road cross both before and after the implementation of the RoadSmart program. Head movements were defined as either:

- a head turn from looking to the side to the middle and vice versa, or
- a head turn from looking from one side to the other, that is, either a 90° turn or 180° turn (Oxley et al., 1995).

The results are presented in Figures 20.1 to 20.4 and summarised in Table 15.

Table 15 Number of head turns and rate of head turns per second

<table>
<thead>
<tr>
<th></th>
<th>Number of Head Turns</th>
<th>Head Turns/sec</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>At Kerb</td>
<td>Road Cross</td>
</tr>
<tr>
<td>Pre observation</td>
<td>0.41</td>
<td>1.40</td>
</tr>
<tr>
<td>Post observation</td>
<td>1.61</td>
<td>3.04</td>
</tr>
</tbody>
</table>

Overall the frequency of head turns and the rate of head turns increased significantly during post observation scores at the kerb and while crossing the road (Wilcoxon P=0.000 for both variables).
Figure 20.1  The frequency of head movements at the kerb, Class 2A

Figure 20.2  The frequency of head movements at the kerb, Class 2B
Figure 20.3  The frequency of head movements while crossing the road, Class 2A

Figure 20.4  The frequency of head movements while crossing the road, Class 2B
CHAPTER 7
DISCUSSION OF FINDINGS

This chapter brings together process and outcome findings and attempts to explain the outcome findings in context of the process (implementation of RoadSmart). However before this it is helpful to re-visit the aims of the study which were to:

- determine the extent of implementation of the Year 2: “Walking safely” unit of RoadSmart during its trialing phase; and
- determine if there was a relationship between implementation and children’s road crossing behaviour.

To focus the study, the following evaluation questions were formed:

- Were the RoadSmart curriculum materials implemented as intended and to what extent? (process)
- Did the road crossing behaviour of seven year old children improve as a result of the implementation of the “Walking safely” component of RoadSmart? (outcome)
- Was there a relationship between process (implementation) and outcome (children’s road crossing behaviour)? (process-outcome).
The working hypothesis draws the process and outcome parts of the evaluation together:

*That fidelity based implementation of the RoadSmart Year 2 "Walking Safely" section can improve the road crossing behaviour of children aged seven years.*

As outlined in Chapter 3, the above evaluation questions align with the intermediate objectives hierarchy of the *RoadSmart* program:

6. To develop and foster behaviour change in children conducive to safe and responsible traffic practices.

5. To make parents/carers aware of their children's physical and psychological limitations in dealing with traffic and to involve them as active partners in their child's supervision and learning.

4. To implement the curriculum resource in primary schools

If implementation of the resource does not occur in primary schools (intermediate objective 4) then it would be unlikely for the other stated objectives preceding this one (intermediate objectives 5 and 6) to be attained. In this instance without implementation of *RoadSmart*, parents would not receive the intended information via the take-home activities to make them aware of their children's limitations in dealing with traffic. Nor would they be involved in their child's supervision and learning in the intended manner. Children would not participate in the practical experiences provided in *RoadSmart* at school and therefore the development of behaviour change conducive to safe and
responsible traffic practices in the intended manner would be less likely to occur.

7.1 IMPLEMENTATION OF ROADSMArt

Were the RoadSmart curriculum materials implemented as intended, if so to what extent?

Did fidelity based implementation occur?

In the first instance this study aimed to determine if implementation occurred in the intended manner. The findings indicate that implementation of the pedestrian component of the Year 2 section of the RoadSmart program occurred. The teaching materials provided were used and the lesson sequences were generally followed. Data collected from direct observations (documented information and photographs taken), from the students and the teachers further verifies that the learning sequences were implemented.

However to what extent did implementation occur and how closely did this match with what was intended? Deviation of program implementation in the classroom generally related to strategies employed by the teacher to conduct activities. They were very minor, for example, introducing a Blackline master at a different time to that suggested. Both teachers modified the way students recorded information on their walks of the local traffic environment to that suggested in the RoadSmart materials. Students used their own jotters and later transposed this information to the Blackline master. However, the
intended content was covered.

While implementation of the real-street practical activities occurred to some extent, it did not occur to the intended level, nor in the intended manner. This shortfall resulted in a lack of additional parent/carer assistance at the road-side and therefore reduced potential practical experience in selecting safe crossing locations and particularly practising opportunities using the “Stop, Look, Listen, Think” strategy while carrying out the road crossing task at a variety of selected marked and unmarked locations.

7.1.1 Parent/Carer Assistance

One of the main concerns regarding implementation was the lack of parent/carer assistance. One of the reasons this school was selected to be involved in the evaluation was because of their parental involvement. The teachers managed to secure a couple of parents to assist with the pre and post observation walks but not during the implementation of the actual program. This was considered to be a major shortfall as children did not get as much practical experience as was intended. This also influenced the method of conducting the “investigation” components of the lesson sequences, particularly of learning sequences 1 and 2. Students worked as one large group and sometimes two smaller, but still large groups, and therefore did not maximise their learning opportunities as was intended through the use of smaller groups. Under the section "How to use RoadSmart" a number of steps are outlined to aid successful implementation. Additional to this are some particular points about supervising the
activities outside the school ground but in the context of school based learning activities.

In order to ensure effective learning opportunities it is essential to provide opportunities for children to walk and investigate the traffic environment. To make sure this is done safely it is strongly recommended that you enlist the assistance of parents and other school staff. Parent helpers should be briefed before the activities to ensure that they have a clear understanding of their role and knowledge of the safety skills that will be the focus of the activity.

7.1.2 Take-home Activities

It appears that parents were more readily available and willing to spend time with their children at home completing the take-home activities rather than during the school day. A total of 76% of take-home activity sheets were completed. Parents' comments indicated that children enjoyed the take-home activities, for example:

- "Alex was very enthusiastic and conscientious - enjoyed by both of us"
- "Jacinta enjoyed her walk and stopped and listened. It was pleasing to see she checked all adjoining streets as we had discussed on previous walks."

Parent/carer comments also indicated that they had opportunities to reinforce what had been learned at school or previously:

- "Andrew knows the rules but doesn't always realise the importance... he had
become more aware of dangers of driveways and talked about the walk at school"

- "Reinforced Stop Look Listen at road. Stop at driveways"

A number of different teaching points were highlighted from parents' comments. This reflects the individual learning experiences attained:

- "Andrew saw many new landmarks after we had mapped out the route to school - more observant."
- "Needs more practise crossing roads daily with adult supervision."
- "Corey is thinking more about what could happen if he doesn't take care crossing the road without using these principles."
- "good at observing danger points"
- "It was a good activity for identifying route to school and for safety precautions".
- ". . she also became more aware of the dangerous crossing places".

From comments such as those above it appears that many parents became involved at a practical level with their child providing the additional experiences and supervised experiences in the real traffic environment as was intended. It also seems evident that several were aware of their child's limitations in dealing with traffic and the need for them to be involved in their child's supervision and learning about safe road behaviours.

The return rate of completed take-home activities was very encouraging. It is possible
that much of this additional individualised practice via the take-home activities which was not measured contributed to the positive increase of the children's road crossing behaviour. This finding is consistent with previous findings, that parents/carers are willing to spend time teaching their children safe road practices. Previous studies have demonstrated that the participation of parents in road safety programs can increase their effectiveness. Given the encouraging outcome findings of this evaluation, and the high return rate of completed take-home activities the contribution of parents/carers involvement in the program cannot be discounted.

7.1.3 Practice in the Real Street Environment

Practice in the real-street environment occurred through two mediums:

- school-based activities
- at home via the take-home activities

The nature of and the time devoted to practice in the real-street environment was only recorded for the school-based component. Over the two learning sequences requiring practice in the real street environment (Learning sequences 1 and 2), the average proportion of total time spent in the real street environment was 37%. Table 6 shows that neither class (during the observed period) practised crossing the road at marked crossings. No observations were made of class 2B practising road crossings at unmarked mid-block locations, however the teacher advised that they had a practice on another day. It is worth noting that for most of these days the air temperatures were in the high
30's to low 40's and they had scheduled times for the implementation of RoadSmart in the afternoons. Needless to say the teachers and the children did not want to spend a great deal of time outside under those conditions. On reflection the teachers said they would choose to conduct this program in the mornings in the future, as children tend to tire in the afternoons.

7.1.4 Teaching Strategies Adopted

The photographs taken depict a variety of mediums/tools used to teach the program as outlined in RoadSmart as well as indicating how the materials were taught. Figures 9 through to 14 illustrate this point. The teachers used the white/blackboard to record information drawn from class discussions (Figure 9), supervised students choosing safe crossing locations and crossing the road in pairs (Figures 12.1 - 12.3), used children to demonstrate why certain behaviours are unsafe (Figure 11.2), had children observe other pedestrians (Figure 10), supervised children practising time-gap judgements in relation to when it is safe to cross (Figure 12.2), used role playing (Figure 13) and small group work (Figure 14). Variation in the teaching of the program will always occur with every different class and teacher. This is not necessarily a negative occurrence. Each teacher and class becomes the owner of the program, and may need extra emphasis on particular components or methods of delivery as compared to other classes or situations. The variation between the two implementations included the duration of the program, length of each session and their frequency. In particular, Class 2B spent a total of 18.32 hours participating in the program and Class 2A spent 6.25 hours. However, the proportion
of time spent in the classroom as compared to that in the real street environment was approximately the same (Class 2A, 63.1%:36.9%; Class 2B, 67%:33%). It appears from the findings that the time spent teaching road safety is not the key to positive road safety behaviour change in children, but rather how the time is spent. The road crossing behaviour of the year 2 children improved across both classes 2A and 2B. Therefore, the findings suggest that one half hour practise in the real-street environment per week, along with extended practise at home via the take-home activities was sufficient to contribute to a positive change in road crossing behaviour. This is consistent with previous studies that training/practise of road safety skills in the real-street environment is a prerequisite for behaviour change. It was felt that teachers did not feel particularly confident in conducting activities in the real street environment. This could have been for a number of reasons including:

- no previous experience with this kind of activity
- lack of parent/carer assistance
- not as familiar with the children at the start of the year
- a perceived "expert" on road safety watching
- large number of children

They expressed the need for additional adult supervision as was suggested in the preparation. Although I was principally an observer, under the difficult circumstances, I was also deemed "assistant", and so helped with supervision during practical activities in both classes. As an "assistant" I took direction from the teacher, however to maximise
learning by practical experience, even smaller groups would have been desirable.

In retrospect, both teachers saw the strength in the program as “putting into practise what is discussed in the classroom”. One teacher also commented that:

- “The observation walk was effective as we were able to see people crossing and discuss this.”
- “Real life experiences are always far better than discussions in classrooms. The experiences are far more meaningful.”

7.1.5 Summary

Data collected indicates that while implementation occurred, it was not classed as “good” implementation. To be deemed “good” or “fidelity based”, there would need to be evidence of children practising road crossing skills at a variety of selected safe crossing locations in small groups under adult supervision. The two main objectives for Learning sequence 2 were not attained (Table 6) within the context of the school-based activity component of the lesson sequence. They were to help students to:

- demonstrate the safe use of the school crossing under adult supervision
- demonstrate safe crossing procedures at marked and unmarked crossing points under adult supervision.
Children from class 2B were not observed crossing the road at all (however the teacher advised that provision of practical experience occurred at other times), while it was evident that children from class 2A had practical experience crossing - however only at a mid-block unmarked crossing point. For some students, comments provided by parents suggest that they extended and built on the classroom learning by providing additional road practise at the road crossing task at a variety of locations in the context of the take-home activity component of the learning sequences. Therefore, it is quite possible that as a result of the combination of school and home learning, the objectives for this lesson sequence were in fact achieved.

7.2 OUTCOME - ROAD CROSSING BEHAVIOUR

Did the road crossing behaviour of seven year old children improve as a result of the implementation of RoadSmart in the school?

Crossing procedures for crossing at mid-block locations were consistent with the objectives of the three learning sequences, but specific to Learning sequences 1 and 2, of the RoadSmart program that the classes were involved in. Overall, the road crossing behaviour of the seven year old children participating in this evaluation did improve. The outcomes approach was represented by a comparison of pre-observation with post-observation road crossing performance. The pre-behavioural observations occurred two weeks prior to the commencement of the RoadSmart program. The teaching of the unit was conducted over the next four weeks and post-behavioural observations occurred
one and a half weeks after the implementation of the RoadSmart materials. A convenient time was arranged with the teachers after filming to identify and subsequently code students. This enabled matched observations of identified students before and after implementation to occur. Each student was allocated a score sheet.

Unobtrusive observation studies (where the individuals observed are unaware that they are being observed) are undertaken both to obtain descriptions of children’s behaviour under normal traffic conditions and to evaluate education programs. Most unobtrusive studies observe children only on purposeful journeys and in simple crossing situations with little traffic. One limitation of this method is that it may be more suitable for older children (9 or 10), however, they would be more likely to be aware of the observer.

Measurements of behaviour in test conditions indicates the ability to display certain behaviour whereas unobtrusive observation can be assumed to indicate the likelihood of the performance of the behaviour. Some researchers argue that only observations of everyday behaviour can be regarded as valid measures to program effectiveness. Others maintain that controlled test situations are more plausibly associated with accidents liability. In this situation zone observations were made under controlled, but not test conditions. While students crossed the road with no reference to road safety or what to do, they were crossing the road in the presence of adults and as part of a school activity. This could have provided more distractions due to the group size and the nature of the activity, but it could also have made the children more responsible and possibly aware that they should do the “right thing”. However, as road crossing behaviour was matched
for individual pre and post observations and as they occurred under the same conditions, this problem would have been minimised as an issue.

The decision was made to observe as many children as possible who had exposure to the RoadSmart program crossing the road. To make it as "natural" as possible students were given an unrelated task to complete and no instructions as to how to cross the road.

- Class 2A and B (pre) - children were instructed to count the number of "even" and "odd" numbers on letter boxes.
- Class 2A (post) - children were asked to note how many houses were "new" or "old" and what the houses were made of.
- Class B (post) - children were having a walk to have a break from their maths.

As there were no houses on the side of the road where the school was, it was necessary for the students to cross the road to continue their task and complete their walk. This walk fitted into their unit of work in the Key Learning Area of Studies of Society and Environment. Overall the findings from this evaluation support prior findings presented in the literature review, that practice in real-street situations is a contributing factor to the development of positive road safety behaviour change.
7.2.1 Behaviour at the kerb

The proportion of children who did not look before entering the road decreased from 75% to 27%. Previous research has indicated that children are less likely to look out well if they do not stop at the kerb or decrease their walking tempo (Van der Molen, 1981). Findings from this evaluation support this notion. The time children spent at the kerb increased after children were exposed to RoadSmart as did their time spent looking for near-side and far-side traffic as opposed to looking at the ground or other places.

7.2.2 Directional Looking Behaviour During the Road Cross

Demetre et al. (1993) summarise that previous studies have characterised young children as unskilled road users. They advocate that provision of training and practice in basic road crossing skills may reduce children's risk on the roads, as increasing automatisation of these skills will free resources for more demanding aspects of road user behaviour. Directional looking behaviour was scored and proportions were calculated so that differences in behaviour could be compared with more ease.

The proportion of time spent looking for near-side and far-side traffic increased significantly (Table 14), while the proportion of time spent looking ahead and at "other" decreased significantly. The proportion of time spent looking at the ground while crossing the ground did not significantly change. It could be assumed that if children spend most of their total looking time looking for approaching traffic (near-side or far-
side in this context) this would result in a safer road cross than if time was spent looking at the ground or at "other (such as at note paper or behind at peer). This suggests that children are being more focused on the road crossing task at hand as a result of participation in the RoadSmart program.

7.2.3 Head turns

The number of head movements and the rate of head movements significantly increased in the post-observation scores as compared to the pre-observation scores both for the entire road crossing task, that is, while at the kerb and during the road cross.

It is tempting to say that making no head movement in a particular direction implies that no visual perception took place, however in principle when using the corner of both eyes one can cover an angle of 165 - 170 degrees. Therefore, one cannot be absolutely sure of what a pedestrian saw, just from observing head movements. However as post-observation data was compared to matched pre-observation data, consistency should be maintained. Literature also suggests that unless children turn their head, they are less likely to notice objects in their periphery vision.
7.2.4 Summary

Crossing the road involves a complex series of actions. The literature offers no definitive answer as to the effectiveness of training programs in improving children's skill at the pedestrian task, however, training in real traffic situations appear to be substantially better than training in a school yard or traffic school (Rivara, 1990).

The findings from this evaluation suggested that children's skill at crossing the road improved after participation in the RoadSmart program, providing children with opportunities to practise road crossing skills and general positive road safety behaviour both at school and at home.

7.3 PROCESS-OUTCOME

Was there a relationship between process (implementation of RoadSmart) and outcome (children’s road crossing behaviour)?

In the context of this evaluation the findings suggest there is a relationship between the implementation of RoadSmart and the road crossing behaviour of seven year old children.
Penna's (1994) evaluation of *Streets Ahead* (the pre-cursor to *RoadSmart*), demonstrated:

that the use of *Streets Ahead* as the foundation for school traffic safety education programs, promotes modest increases in knowledge (13%) and improvements in attitudes (7%), but does not significantly influence road crossing behaviour. However, as students at some schools showed small improvements in behaviour, it is possible that the use of *Streets Ahead* in certain ways can positively influence behaviour (Penna, 1994, p. 16).

Two schools in Penna's evaluation showed behavioural improvements in the order of 10-15%, while a third school showed a small increase of 1-4%. The program in one of these schools appeared to have been conducted over three weeks for two to three hours per week. Two of the classes in this school spent around 50% of the time outside, and practised crossing behaviour at real sites, while the other two classes spent 11-25% of the time outside but did not use crossing sites. This suggests that given the correct circumstances (implementation), the use of *Streets Ahead* could positively influence behaviour. Penna therefore concluded the following:

On the evidence examined it is not possible to assume strong causal links between the teaching approaches outlined above, and student outcomes measured by the evaluation. However in general terms the links seem to support the findings reported in the literature that practise in real life situations is prerequisite to behaviour change. (Penna, 1994: p.69)

The classes in the *RoadSmart* evaluation spent an average of 37% of total time in the...
real street environment, practising crossing strategies at driveways, selecting safe crossing locations and crossing the road at real sites.

As the differences between pre and post observation scores were significant at the 5% level, the null hypothesis is rejected. The null hypothesis being that there is no difference between the mean of the pre-observation scores and the post observation scores. This suggests that as a result of participation in the RoadSmart program, children spent more time at the kerb checking that there was no approaching traffic before commencing to cross and that they performed more head turns looking for near-side and far-side traffic while crossing the road. That is, the quality of their observable visual search both at the kerb and while crossing the road (from observing head movements) improved as a result of participation in the RoadSmart program.

7.3.1 Parent/Carer Involvement

Two overriding principles and strategies are that children need to have supervised first-hand experiences of real traffic situations and that for such programs to be optimally effective parent/carer participation should be included as a cooperative component. Parents can provide additional time and supervised experiences in their local traffic environment to encourage children to construct their own understandings and develop the attitudes, skills and behaviour required to operate effectively and safely in the traffic environment. During the implementation of RoadSmart at the school, parents/carers were involved in the program indirectly through the take-home activities. In this study,
the number of hours parents/carers spent with their children or the type of practical experiences incorporated were not recorded. However from comments written on the "parent feedback" sheet and the number completed it appears that parents/carers were actively involved in the practical development of their child's road safety behaviours including supervised practises at crossing the road at a variety of selected safe locations.

To gain maximum benefit and practical experience for the children, the learning sequences in RoadSmart recommend parent/carer assistance with the school based activities as well - during planned walks in the traffic environment. It would therefore appear to be beneficial to the further development of children’s safe road skills and behaviour to have parents/cares involved in the actual school based activities as well.

7.4 SUMMARY

Improving the traffic skills of child pedestrians is not an attempt to place full responsibility for pedestrian safety on the child, but rather an attempt to make the child's behaviour more congruent with the task at hand. Theoretical instruction in the classroom alone does little to affect behaviour although it may improve knowledge and understanding of the traffic task (Rivara, 1990).

It is not possible to actually say the implementation of RoadSmart caused the outcome, the improved road crossing behaviour of the children. An experimental design is required to prove this. However, there is evidence to suggest that when implementation of the
RoadSmart program was experienced by children, that they by and large exhibited the intended behaviour. Therefore, there are strong grounds to infer there is a causal link.

Overall findings from this evaluation concur with those of other researchers (Demetre et al., 1993; Rivara, 1990; Roberts, 1980; Thomson et al., 1996), that children under 9 possess capabilities that can be fostered through education and real-street experience to enable them to function more effectively on the road.

These findings however, do not indicate for how long children retain the improved behaviour nor can they necessarily be generalised to other crossing locations under different circumstances.

For implementation to be considered "good" or "fidelity based", according to the intended manner, the following features should occur in addition to those already observed:

- children to practise using road crossing skills at a variety of marked and unmarked locations
- parent/carer (volunteer) assistance be secured so that children can have practice in small groups under adult supervision in the context of the school based activities.

This evaluation has revealed some encouraging findings - that as a result of exposure to
a pedestrian component of the *RoadSmart* program the road crossing behaviour of seven year old children can be modified positively. While implementation occurred and improvements were observed in children's road crossing abilities, it could be assumed that if "good" implementation occurred then even better improvements could potentially be observed.

Teachers are causal agents themselves. It is not uncommon for particular teachers to make tremendous differences not only in the classroom but also in the implementation of programs. However, one can never be certain that a particular program or teacher will produce good results (House 1991).

One can evaluate programs on a particular site with considerable efficacy, even while not knowing exactly which important causal structures are at work in what interactions, but one cannot expect with great confidence that program to have the same effects at other sites (House, 1991, p.8).
CHAPTER 8

CONCLUSIONS, IMPLICATIONS & RECOMMENDATIONS

While research in this area has demonstrated that instruction can be effective in modifying the behaviour of children in traffic, the extent to which it can reduce the frequency of road accidents involving children remains unclear. An important issue involving the efficacy of traffic safety education relates to the teaching methods and strategies suggested to be most effective. Most research has demonstrated that lots of practice in the real traffic environment combined with some in-class teaching is the most effective way.

There is considerable differentiation about what children need to be taught and how they should be taught. Some training methods, for example Thomson et al., (1996) and Young & Lee (1987) advocate simulated practice at the roadside with small groups facilitated by adults. While these training methods produce very encouraging results, they may not be readily implemented in schools. A method needs to be provided that offers flexibility to meet the educational needs and constraints of the education system children and teachers are presented with. For example, some schools have a very good network of parents to assist with programs, while others are not so fortunate. Some teachers are very resistant to changing their “set” patterns of teaching and so are unlikely to venture outside to the real street environment with children. Providing a program that readily lends itself to the current educational trends, makes efficient and meaningful use of time, and provides ways for the activities to be extended beyond the school is the best
that can be done. It appears that the total time spent teaching road safety is not as important as how children are taught and what they are taught. This evaluation revealed encouraging findings and provided insights to implementation strategies employed by teachers. It can be inferred from the strong findings presented that if teachers implement RoadSmart in the intended manner then the road crossing behaviour of children can be influenced positively. That is, that fidelity based implementation of the RoadSmart Year 2 "Walking safely" component will improve the road crossing behaviour of children aged seven years. Therefore the working hypothesis for this evaluation is accepted.

As well as providing practical experience in the real-street environment, the involvement of parents/carers is also valuable. Rivara (1990) emphasise the importance of parents for two reasons:

- Parents set the expectations for children's performance in traffic
- Parents can extend and reinforce any educational efforts begun in the schools

Prior to the development of RoadSmart two key issues to be addressed were:

- its attempt to reduce the identified gap between increases in knowledge and attitudes of traffic safety on the one hand and changes in behaviour on the other; and
- its provision of ways that parents/carers may be included in activities emanating from the school activities.
Findings from this evaluation indicated that the above two key issues were addressed through implementation of the RoadSmart program. Overall, the objectives for the lesson sequences were translated into program delivery, that is implementation occurred, and the behavioural objectives evaluated as the outcomes component were achieved, with positive findings. Findings also indicated that the intermediate objectives, which provided the context for this evaluation, were attained in line with the measurement limitations focusing on the implementation of the year 2 “Walking safely” component of RoadSmart.

Good implementation of the RoadSmart program is a key to improved child pedestrian skills, particularly as they relate to safe road crossing practice. To encourage and promote good implementation, training on what constitutes “good” implementation may be a worthwhile component. As curriculum space and time is a critical factor, training teachers in fidelity based implementation of the RoadSmart program could provide valuable outcomes while using time available efficiently and effectively. Training should be a means of:

- highlighting the importance of practice in the real-street environment in order to improve the safe road behaviours and skills of children
- training teachers how to teach these skills at the road-side to children
- emphasising the importance of having additional adult assistance for the carefully planned practical components so that children can practise skills in small groups
- emphasising the importance of the participation of parents/carers through the
take-home activities

8.1 **RECOMMENDATIONS**

In summary, the following recommendations are suggested.

1. Teachers be trained to encourage fidelity based implementation of *RoadSmart*.

2. Further investigations of this nature be developed to monitor and evaluate the type and level of parent/carer involvement in the take-home activities.

3. That other behavioural objectives in the *RoadSmart* program across Prep to year 6 be evaluated using the methodology presented in this evaluation.

4. That a wider scale evaluation of this nature be conducted when the program is settled and established in primary schools in Victoria.

5. That the evaluation model outlined for this study be applied to other road safety education evaluations.
CLASS 2B 28 STUDENTS (15 GIRLS, 13 BOYS)
27/2/97
LEARNING SEQUENCE 1: FOOTPATH HAZARDS
ROADSMART BOOK 1 PP 68-69

IMPLEMENTATION OBSERVATIONS
1:30 PM - 3:30 PM.

Purpose: To examine some pedestrian safety issues related to footpaths in the local area.

Objectives:
This learning sequence will help students to:
• identify what makes a footpath safe or unsafe
• formulate strategies for dealing with unsafe footpaths
• demonstrate safe pedestrian behaviour

Tuning in 1:35 pm - 1:50 pm.

Teacher had a number of Discussion Prints on display from the Streets Ahead resource. These were depicting a number of driveways, footpaths and a quiet street (Dp 2, Dp3)

T: Lets look at some Dps and talk about them. Tell me about this one (Dp 2), what can you see?

S: Lots of houses, signs, streets signs, trees, roads, telegraph pole

T: Do you think it is a very busy street?
S: No
T: Not while this photo was taken
T: If we were walking down the footpath, what might we have to look out for?
S: cars
T: but cars are on the road
S: when crossing the road
S: bikes / driveways - because cars might come out
T: cars might back out
S: cars might go in
S: cracks in the footpath / stones, gravel, loose stones / water
T: Why?
S: might make you slip or skid
S: strangers / dips / gutters / you need to look and listen when crossing roads
T: What for?
S: Look for cars, listen for cars that might be coming close / there might be a car a long way away and you can’t see it, but you might hear it. / You should keep on the footpath, don’t get too close to the road.
Teacher had a child demonstrate walking along a “pretend” footpath in the classroom and show how and where to look.

T: You need to look a few times, both ways.

S: If it’s a busy road you have to cross at traffic lights.

S: but there might not be traffic lights.

T: What sort of things do we have to look out for on footpaths?

S: Strangers

T: Tell me what’s happening in this DP (DP3), how do you know this car is not parked?

S: It isn’t still, looks like the car is travelling

T: Who plays in their driveways at home? (A lot of children put their hands up)

T: If playing in your driveway, what should you do?

S: Must ask a grown up to get the ball and stop, look and listen.

T: Stop, Look and listen.

S: I don’t usually take my toys out the front.

T: Well in a minute we’re going to go out for a walk. You people are going to be assistants.

T: Who has heard about VicRoads?

S: They are concerned about safety on the roads.

T: and on the footpaths

The teacher told a story of how she was rung by VicRoads to ask for their help and she initially said she was too busy. She explained that VicRoads needed help from children to know what’s unsafe on the footpaths.

Some of the children were excited about going on the walk, others were not.

T: There are a few rules: Stop, look, listen.

The following information was recorded on the blackboard:

- cars
- bikes
- cracks in the footpath
- water
- strangers

**Investigating 1:50 pm - 2:40 pm**

**Part A**

Each child took a jotter and texta with them to take notes on the way.

The children were lined up. No parents had been organised to assist for the walk, so I was deemed “a helper”. The walk: out of the school gate, along Reading Ave, turn left down Loma Linda Grove to a few houses passed the end of the school and back again (see map).

Reading Ave: A few hazards were pointed out and discussed (see photos)

1. A high pile of bricks, a pile of gravel and sand on the opposite side of the road just next to a
driveway. The teacher took a student across the road with (demonstrating the stop, look and 
listen procedure). The student walked behind the pile of bricks, while the students tried to see her. 
This led to a discussion about a scenario where a car might back out of the driveway. Would the 
driver be able to see the child?

Loma Linda Grove

2. Just at the intersection of Reading Ave with Loma Linda Grv, gravel had just been laid on the 
road. There was a sign warning drivers of the loose gravel (see photo). The class discussed how 
this could be a hazard: a car might skid, gravel might fly up, keep away from the road so as not 
to get hurt.

3. Cracks in the footpath: might trip up, could be a problem for bike riders.
4. Driveways - particularly when vision is obscured by fences, shrubs or letterboxes.

I pointed out to the teacher the need for the children to think as they crossed the driveway instead 
of trusting the opinion of previous children. The teacher added Think to the Stop, Look and 
Listen procedure the children established. They discussed why they need to think as they crossed 
driveways? What to look for (drivers in cars, exhaust, cars leaving or entering driveways) What 
to listen for (reversing signals, engine sounds) and the importance of making a decision if it is safe 
to cross.

Children practised SLLT procedure as walking across driveways in pairs. There were a number 
of children who did not look for the possibility of cars entering the driveway from the road 
without being reminded. A number of children kept walking while looking (in this case it would 
have been too late if a car had been reversing).

Part B: Classroom follow up

Children added to the list of footpath hazards on the blackboard. (See photo, the blue writing was 
added)

• letter boxes
• high fences
• big bushes
• gates
• building bricks
• big green bins A student reminded the teacher to add Think to Stop, look, listen.

Reflecting

T: (introducing BLM 1: Pedestrian hazards) Who knows what a pedestrian is?
S: someone walking
T: Anyone walking. Hazards are things that might harm us.
Appendix A

The teacher had photocopied one sheet for each child, however modified the sheet so the children had more space to write.

The teacher revised the names of the streets that the students walked along and explained that they were to select one hazard from the list on the board and write a sentence about why it was dangerous. Students were told not to complete "what to do".

The teacher will continue this lesson next week (Wed)
APPENDIX A

CLASS 2A, 26 STUDENTS (14 GIRLS, 12 BOYS)
28/2/97
LEARNING SEQUENCE 1: FOOTPATH HAZARDS
ROADSMART BOOK 1 PP 68-69

IMPLEMENTATION OBSERVATIONS
1:30 PM - 3:30 PM.

Purpose: To examine some pedestrian safety issues related to footpaths in the local area.

Objectives:
This learning sequence will help students to:
• identify what makes a footpath safe or unsafe
• formulate strategies for dealing with unsafe footpaths
• demonstrate safe pedestrian behaviour

Tuning in 1:45 pm - 2:10 pm.

The teacher wrote the words “Footpath hazards” on the white board.
T: What do we mean by hazards?
S: a driveway is a hazard.
T: So what is a hazard? What is another word we could use instead of hazard? One beginning with D?
S: danger
T: so a hazard is the same as danger
T: Put up your hand if you have to cross some driveways on your way to school? What should you do as you come to a driveway?
S: Look
T: Another?
S: Stop, look and listen when you come to a driveway.
T: What are you looking for?
S: any cars
T: where?
S: coming home, driving out
T: could they always see you?
S: sometimes if you’re small they might not
T: reversing cars, might not be able to see in mirror. When I come out of my driveway I always beep because I can’t see clearly because of my fence. So children need to listen./ What’s another hazard?
S: road
T: today we won’t be crossing any roads, we’ll only be looking at them.
S: you look left, look right and look left again
T: what about the actual footpath itself?
S: bikes, postie
T: there are lots of dangers on the road, that’s why we walk on the footpath.
S: never be near the gutter because sometimes the cars swerve. / some silly people play cricket on the road.
T: Teacher introducing BLM: Hands up if you know what a pedestrian is?
S: someone who is walking across the road
T: a pedestrian is someone who walks. We will be walking in pairs when we go out. We’ll be taking a jotter and a texta with us. The main thing we need to know is stop, look and listen

The following information was recorded on the blackboard: (see photo)

- driveways
- road
- behind a car
- building site
- piles of sand, bricks, rocks
- corners
- stones on road
- bikes
- postperson
- bumpy footpaths
- working - new footpaths

Investigating 2:15 pm - 2:45 pm
Part A
Each child took a jotter an texta with them to take notes on the way.
The children were lined up. No parents had been organised to assist for the walk, so I was deemed “a helper”. The walk:
out of the school gate, along Reading Ave, turn left down Loma Linda Grove to a few houses passed the end of the school and back again (see map).

Reading Ave: A few hazards were pointed out and discussed (see photos)
1. A high pile of bricks, a pile of gravel and sand on the opposite side of the road just next to a driveway. This led to a discussion about a scenario where a car might back out of the driveway. Would the driver be able to see the child?

2. Dog poo: discussed this in relation to dogs using the footpath
Loma Linda Grove

3. Just at the intersection of Reading Ave with Loma Linda Grv, gravel had just been laid on the road. The class discussed how this could be a hazard:
a car might skid, gravel might fly up, keep away from the road so as not to get hurt.

4. Cracks in the footpath: might trip up, could be a problem for bike riders.
5. Driveways - particularly when vision is obscured by fences, shrubs or letterboxes.

I pointed out to the teacher the need for the children to think as they crossed the driveway instead of trusting the opinion of previous children. The teacher added Think to the Stop, Look and Listen procedure the children established. They discussed why they need to think as they crossed driveways? What to look for (drivers in cars, exhaust, cars leaving or entering driveways) What to listen for (reversing signals, engine sounds) and the importance of making a decision if it is safe to cross.

Children practised SLLT procedure as walking across driveways in pairs. There were a number of children who did not look for the possibility of cars entering the driveway from the road without being reminded. A number of children kept walking while looking (in this case it would have been too late if a car had been reversing).

6. The children saw 3 posties, one which had to go on the road to go around the group.

Part B: Classroom follow up

Children added to the list of footpath hazards on the blackboard. (See photo the blue writing was added)

- glass
- branches
- plants
- fences
- dogs
- prickles

Reflecting

T: Who remembers the names of the streets?
S: Reading Ave and Loma Linda Grove.

T: explained what to do on the BLM, gave an example of a hazard in Reading Ave, the class discussed why it was a hazard and what could be done.

The teacher had photocopied one sheet for each pair, however modified the sheet so the children had more space to write.
CLASS 2B  28 STUDENTS (15 GIRLS, 13 BOYS)
6/3/97
LEARNING SEQUENCE 2: CLEVER CROSSING
ROADSMART BOOK 1 PP 72-75

IMPLEMENTATION OBSERVATIONS
1:30 PM - 3:30 PM.

Purpose: To develop an awareness of safer places to cross roads in the local area.

Objectives:
This learning sequence will help students to:
- demonstrate the safe use of the school crossing under adult supervision
- demonstrate safe crossing procedures at marked and unmarked crossing points under adult supervision
- identify factors that affect seeing and being seen

Introduction (not in the book)
1:35 pm - 2:00 pm.

T: What were the 4 special things we talked about last week?
S: SLLT
T: Today we’re going to look at crossing the street. Some of you walk to school and some are driven. Reading Ave in the morning is very busy. Lots of children being dropped off and children crossing.

Teacher had a number of Discussion Prints on display from the Streets Ahead resource. These were depicting a number of driveways, footpaths and a quiet street (Dp 2, Dp3 (draft)),

T: Lets look at some Dps and talk about them. Tell me about this one (Dp 3), what can you see? Where might these children be going?

S: School / cars parked in the driveway

T: is this a safe place to cross the road (group of kids)?
S: No because there’s no traffic lights / Doesn’t matter Priscilla - no cars moving, so its safe
T: stand up if you agree with Priscilla (most stood up)

T: stand up if you’re not sure
(10 stood up)
stand up if you think its unsafe (2 stood up)
T: Why?
S: You can’t see if there’s a car coming
T: what about if there are no traffic lights?

RoadSmart - An Evaluation
there are no people in those cars
we can see the children have stopped. It doesn’t look like any cars are coming, parked
cars on the opposite side, clear line of vision, therefore its safe for them to cross. If they
were these people (1) it would be a different story.

DP 5 Tell me something about this picture
there are cars front and behind
looks like a busy road, lots of cars parked
you can see the city in the distance.
is this a safe place to cross? It doesn’t matter if its right or wrong, I just want your
opinion.
4 stood up
why?
students are looking and they have stopped / the cars might let them go across / the cars
are stopping / the lights are red, so the cars are stopping
not a safe place to cross ( everyone else stood up ) Tell me why?
the cars haven’t stopped, could run over children / they should be walking up to the
crossing / better to use the crossing than not because it is safer
why?
traffic lights / has a walking sign and the cars will stop.
why else?
lots of traffic on the road / sometimes when the lights are red, the cars still don’t stop.
who remembers last week when we walked Alice along the building bricks. Have a look
at these children, are they easy to see? (No) what would happen if a car moved out from
a parking space?
kids could get bumped or run over
it’s hard for drivers to watch out for kids between parked cars.
stand up if you have seen kids running across the road from between parked cars? (16)
stand up if you have? (9) Not very safe.

DP 9 (SA) hands up if you’ve seen this happen? Is this a safe thing?
S’s: no / child could get run over
what about the children on the other side?
yes safe b/c getting out on the footpath side.

DP 8 (SA) Bus safety why are the children stopping
waiting for the bus to go.
why didn’t hey just go straight ahead?
bus might reverse / the bus is tall and wide and hard to see around.

Tuning In  2:00 pm - 2:25 pm.

Get into groups of 4. In your groups 1 person to o the writing. Stand up if you are the writing
person. Task was explained (the sheet was enlarged to A# size from the BLM 2: Clever Crossing.
(2:10 - 2:15 pm)
One person stand up from each group who were not writers - “speaker”. If your group has
something that has already been said, don’t repeat it.
1. Luke: crossing without thinking, if don’t use SLLT
2. Matthew: cars, bushes, bricks, buses
T: Why bushes?
S: bushes might hide you
3. Priscilla fences, bikes, trams, parked cars
T: how do bikes make it difficult for you?
S: they can’t stop quickly
4. Tom: unsafe drivers, gravel, rink drivers.
T: We’re now going to go on a walk. Choose a partner you can be sensible with.

Investigating 2:30 pm - 2:50 pm

No parents had been organised to assist for the walk, so I was deemed “a helper”. The walk:
out of the school gate, along Greythorn Road turn L down Reading Ave and into the school (see
map).

Greythorn Road: standing behind the school fence the children observed the road discussing when
it was most busy and the signalised pedestrian crossing. The teacher then took the children along
the footpath to watch the signalised ped crossing. An adolescent male crossed at the lights. He
did not look to check that vehicles had stopped, nor did he look as he was crossing, he did not
keep within the white crossing lines. The children discussed this. Then a man (father from the
school) crossed demonstrating the correct procedure. As the children had observed a good and
bad crossing she did not think it necessary for any of the children to cross.

The teacher chose the corner of Greythorn Rd and Reading Ave to discuss if it was a safe crossing
place and why. It was decided that it was not a safe crossing place: a dip in the road, can’t see if
cars are coming, 3 roads to watch for, no traffic lights and there are some a little way up, not a
clear line of vision.

Reading Ave: a few sites were chosen to discuss if they were safe or unsafe and why (see photos
taken).

Part B: Classroom follow up 2:50 pm - 3:00 pm

continue on part A - adding to the list. Choose another person to share the new things that were
added to the list.
The times when the streets are busy.
T: We’ll do Part B another day
Purpose: To develop an awareness of safer places to cross roads in the local area.

Objectives:
This learning sequence will help students to:
- demonstrate the safe use of the school crossing under adult supervision
- demonstrate safe crossing procedures at marked and unmarked crossing points under adult supervision
- identify factors that affect seeing and being seen

Introduction 1:40 pm - 1:55 pm
DP 9 (SA)

T: think about what and who you can see, think about where they are, what is happening and what might happen.
S: person is saying stop. No he’s closing the door / the car could hit him getting out of the car on the road side and his Mum isn’t watching.
T: what’s dangerous?
S: the car could smash the door off and the car could hit the child as well
T: what should the child have done?
S: slid across the seat and go out the other side
T: need to go the footpath first

DP 3 (SA) Driveways

S: the car is moving. Leave the ball
T: easy to get another new ball, but not a new you. Before stepping onto the road what do you have to do??
S: look 2 times L and R
T: more, something else we talked about
S: SLLT
T: it’s important to think, lets practise. I don’’t think any of these children have done hose things. What are some things that could make it hard for you when you’re crossing the road?
S: vehicles, look carefully
T: cars, buses, trucks, what else, think about what we jotted down last week.
Appendix A

S: loose stones, uneven bits, cracks, bumps, bricks, building materials, parked cars
T: why are parked cars dangerous?

S: Lachlan - brake might go off
    Kelly-Anne - if can’t see past it, you can’t see
T: it hides you
S: might not see someone in the car and they might start the engine an go./ you’ve got to
    walk with an adult/ trees, bushes

Tuning In 1:55pm - 2:10 pm
last week we shared our sheet b/w 2 people. This week you have your own sheet. You can write
down answers on your own sheet. Think of things that could make it dangerous. Just a few
minutes and we’ll see if we can add anything to our list

2:05pm
add to the classes list on the whiteboard:
dogs, cats, crossing at a corner, don’t run across tram, train tracks, could also be dangerous if you
dawdle across the road.

Investigating 2:10 pm - 2:45 pm
Part A
No parents had been organised to assist for the walk, so I was deemed “a helper”. The walk:
out of the school gate, along Greythorn Road turn L down Reading Ave and into the school (see
map).

1. Observed someone crossing at signalised ped crossing
2. Selected some spots and discussed if safe or unsafe
3. Selected safe spot in Reading Ave and crossed in pairs.
4. Crossed as group walking back across the road.

Children practised SLLT procedure as walking across Reading Ave in pairs.

Reflecting 2:45 pm - 3:20 pm
2:45 - 2:50
Looked through the list on the board as a group and discussed what they saw. Saw lots of parked
cars and cars parking which made it tricky.

Part B of sheet: 2:50 -

T: what sort of crossing place did we look for?
S: no parked cars / no big trees close by / far enough away from the corner
T: what did we do when we crossed the road?
S: SLLT

when finished part B, you can get Resource sheet 2 and colour in.
CLASS 2B  28 STUDENTS (15 GIRLS, 13 BOYS)
13/3/97
LEARNING SEQUENCE 3: WHAT WILL I SAY? WHAT WILL I DO?
ROADSMART BOOK 1 PP 76 - 77
IMPLEMENTATION OBSERVATIONS
1:30 PM - 2:50 PM.

Purpose:
To encourage students to begin to take some responsibility for their own safety in traffic.

Objectives:
This learning sequence will help students to:
• explain how their behaviour may affect the safety of others
• identify situations that may make road crossings difficult
• formulate strategies to deal with unsafe situations.

Tuning In 1:40 pm - 2:00 pm.
T: Have you ever done something with a friend that you thought was not a safe thing to do, but you did it anyway because you were frightened of what they would say?
S: everyone was riding across the road and I thought I should do it. I didn't want to but I thought they would make fun of me if I didn't.
T: Anyone else?
S: X and X came over and wanted to go to the oval. When we got to the oval, my Mum said not to go near the workers.... (could not hear all of this student's response).

I always wanted to go around the bar and I tried and I did it.

A good friend wouldn't make fun of you.

T: That's a very grown up thing to know. Good on you Alice. What could you do if you don't want to do something.

S: Tell they could but I'm not.

T: You could stand up to them - that would take a lot of courage.

S: Could tell them it is lunchtime, do something else. Tell them it's not the right thing to do. My Mum told me this - you just ignore them and say you're talking rubbish.

T: We have some situations here and we'll act one of these together. I need a terrific audience and some actors. - read out scenario no. 4

Students and teacher acted out the scenario.
T: What should Tom have done?
S: He shouldn’t have gone onto the road.
T: What should he have done? There is no room.
S: waited - he would have to wait a long time.
T: What could he have done?
S: He could have walked a little bit further.
T: But the van was in the way.
S: He could have SLLT
T: He could also have said to the driver “can you help me, I can’t see around the van”.

T: This is only going to work if you are sensible. I have 5 scenes we can act out - we can have 5 little groups of people.

Investigating 2:00 pm - 2:10 pm

5 mins to read it carefully, 5 mins to plan how you are going to act it out.

2:10 pm children acted out their scenarios outside and discussed strategies for safe road behaviour.

2:40pm Discuss strategies

3 judges were appointed by the teacher.
T: What would you do if there was no grown up around. You need to be the thinking person, you have to decide which path to go down, hard decisions to make. You need to stop and think - what should I do here? This is hard when you don’t want to do what all of your friends are doing.
Appendix B

Child's name: ___________________ coded no.: ____  sex: ____  Tape ref: ____
Crossing partner: ___________________ coded no.: ____  sex: ____  Tape _______
Location: Loma Linda Drive, Balwyn

1. Pre-kerb
Approach on footpath
Style of approach

2. At kerb
stops
near side
far side
ahead
ground
other

   stopping time ________
   head turns               number ________               rate ________
   passing cars             near side               far side

3. Road Crossing
near side
far side
ahead
ground
other

   head turns               number ________               rate ________
   time at which reached far-side kerb: ________
   crossing time: ________
   passing cars             near side               far side
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Analysis of *** differences *** (post - pre), kerb variables.

**Descriptive Statistics**

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T-Test of the Mean

Test of \( \mu = 0.000 \) vs \( \mu \neq 0.000 \)

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Wilcoxon Signed Rank Test

TEST OF MEDIAN = 0.000000 VERSUS MEDIAN N.E. 0.000000

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Analysis of *** differences *** (post - pre) for crossing variables.

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T-Test of the Mean

One-sample t-tests on the differences (i.e. a paired t-test). This is appropriate because the same students are tested pre and post. The test is of the null hypothesis that the true mean difference is zero, against the alternative hypothesis that it is not (i.e. a 2-sided alternative).

Test of mu = 0.000 vs mu not = 0.000

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<tr>
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<td>45</td>
<td>0.723</td>
<td>32.923</td>
<td>4.908</td>
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<td>0.98</td>
</tr>
<tr>
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<td>45</td>
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<td>1.113</td>
<td>0.166</td>
<td>-2.96</td>
<td>0.0049</td>
</tr>
<tr>
<td>C50</td>
<td>45</td>
<td>-8.498</td>
<td>19.431</td>
<td>2.897</td>
<td>-2.93</td>
<td>0.0053</td>
</tr>
<tr>
<td>C51</td>
<td>45</td>
<td>1.644</td>
<td>2.432</td>
<td>0.363</td>
<td>4.54</td>
<td>0.0000</td>
</tr>
<tr>
<td>C52</td>
<td>45</td>
<td>-0.271</td>
<td>1.945</td>
<td>0.290</td>
<td>-0.94</td>
<td>0.35</td>
</tr>
<tr>
<td>C53</td>
<td>45</td>
<td>-0.271</td>
<td>1.945</td>
<td>0.290</td>
<td>-0.94</td>
<td>0.35</td>
</tr>
<tr>
<td>C54</td>
<td>45</td>
<td>0.339</td>
<td>0.442</td>
<td>0.068</td>
<td>5.14</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

Wilcoxon Signed Rank Test

The Wilcoxon test is relevant because the t-tests assume a normal distribution for the data. The large number of zeroes here mean that this assumption is not justified. The Wilcoxon test does not assume normality, and operates on the rank of the differences.

TEST OF MEDIAN = 0.0000000 VERSUS MEDIAN N.E. 0.000000

<table>
<thead>
<tr>
<th>N FOR WILCOXON</th>
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<th>WILCOXON STATISTIC</th>
<th>P-VALUE</th>
<th>ESTIMATED MEDIAN</th>
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<td>C42</td>
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<td>39</td>
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<tr>
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<tr>
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<td>44</td>
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<tr>
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<td>0.001</td>
</tr>
<tr>
<td>C46</td>
<td>45</td>
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<td>235.5</td>
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<tr>
<td>C47</td>
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<td>C54</td>
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<td>45</td>
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<td>0.000</td>
</tr>
</tbody>
</table>
Note: for C53 (difference in the rate of head turning) the Wilcoxon test should definitely be preferred, because the t-test is clearly inappropriate: the outlier affects it badly.

Character Dotplot

```
..::
::
:::
:::
::
::
:::
:::

--------------+---C53
 0.0  5.0  10.0  15.0  20.0  25.0
```
REFERENCES


*RoadSmart - An Evaluation* 163


Author/s: Leadbeatter, Corinne

Title: RoadSmart: an evaluation: an impact evaluation of a road safety education program and the road crossing behaviour of 7 year old children

Date: 1997


Publication Status: Unpublished

Persistent Link: http://hdl.handle.net/11343/38785

File Description: RoadSmart: An Evaluation: An impact evaluation of a road safety education program and the road crossing behaviour of 7 year old children

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