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Abstract Review of primary school road safety education materials and practices in the categories of pedestrian, bicycle, restraint usage and alcohol and safety. Developers and teachers of road safety were surveyed. The major materials were collated and the instructional design of the materials analysed. Recommendations for future development and implementation of primary school road safety materials are suggested.				
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PRIMARY SCHOOL ROAD SAFETY CURRICULA: **A REVIEW OF AUSTRALIAN MATERIALS AND PRACTICES**

prepared by
ALEX MAGGS
&
MARGARET BROWN

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This project could not have been completed without the tremendous support of so many people. Throughout the project, the personnel of the various road safety authorities across Australia gave generously of their time and assistance to ensure that meetings were arranged with relevant personnel from their own Departments as well as personnel from the Police Departments, Education Departments, Universities and with primary classroom teachers from the public, private and catholic school systems of education.

Personnel from the road safety authorities arranged for Developers' and Teachers' surveys to be disseminated, where possible, to a random selection of teachers. The responsibility for this task so often required extensive organisation and co-operation between a large number of people.

The developers of road safety materials and the classroom teachers who responded in such large numbers, have enabled the researchers to explore and describe primary school road safety education from the viewpoints of what materials are available and how road safety is taught across Australia.

EXECUTIVE SUMMARY

A review of primary school road safety education materials and practices in four road user categories was undertaken. The categories included pedestrian, bicycle and restraint usage safety together with alcohol and safety.

Thirty one developers of road safety education materials completed surveys and responded to interviews relating to current and future development and implementation of road safety materials. Five hundred and ninety primary school teachers responded to a survey relating to their present road safety program and their future needs in this area. In addition, the major primary road safety materials were collected. These were analysed to determine the effectiveness of the design of the instruction.

From the developers' survey, it was noted that most of the materials being developed were either for pedestrian or bicycle safety education. Materials for restraint usage were scant and materials for alcohol and safety education were virtually non existent. Developers requested a kit of documents to assist their development of effective materials.

Analyses of the teachers' survey showed that the teaching of primary road safety education was not a high priority. Primary teachers surveyed taught road safety incidentally, mainly through class discussion. Less than 40% of teachers used available kits or programs. Teachers were often unaware of what materials were available or considered available material unsuitable. An annotated bibliography, with critiques, of national, State and Territory materials would assist this area. In addition, kits or programs that have been effectively designed and are 'ready to teach', should be made available.

Materials currently available have not been effectively designed to ensure systematic and sequential development of road safety knowledge and behaviours. Future development of materials would need to utilise the principles of instructional design in order to produce effective materials which will be educationally effective.

CHAPTER ONE: CHILD ROAD SAFETY

1.1 Introduction

Road crashes involving children have been the subject of concern throughout the automotive age. With the increasing population and increasing number of automobiles, the problem has become such that the occurrence of road crashes is the leading cause of child death and disability after age one (Thompson, Bornstein & Connelly, 1980; Organisation for Economic Co-operation and Development (OECD), 1983; Elliott, 1985).

Nevertheless, children are allowed to participate in traffic as pedestrians, cyclists and passengers from a very early age (Sandels, 1975; Elliott, 1985) with the result that

Over 400 children ages 0-16 are killed on Australian roads each year, and, at least an additional 4,500 are seriously injured (i.e. admitted to hospital)...at least as many again are treated for injuries whilst many more are involved in accidents which go unreported.

(Elliott, 1985:21)

Historically, nearly all the national and State attempts to improve road safety have taken the form of legislation and enforcement of mandatory or prohibited behaviour or technical improvements to the road environment. Child road crashes have not been manifestly reduced by these methods, suggesting that the legal and engineering approaches, whilst striving to develop a safer environment, are not sufficient on their own.

Since the majority of child road crashes can be ascribed to human error (Singh, 1982), successful prevention should include the establishment of educational programs. To this end Pearn (1984:538) suggests that

An essential underlying theme of any educational programme is to establish a basis or core of knowledge with a sound understanding of principles, so that the individual may cope with the inevitable, but unforeseen and unanticipated, changes which must occur in his future life.

It is believed that long-lasting positive attitudes to road safety can come from an education that provides not only an understanding of road safety measures and their necessity, but practical **skills** to ensure safe road use. Furthermore, it is believed that this education should start from an early age and be given by teachers as well as by parents (House of Representatives Standing Committee on Road Safety, **1984:24** hereafter referred to as HORSCORS). In fact, in the report of the HORSCORS (**1984:24**), road safety education in schools was ranked the second most important crash preventive measure from the public's point of view (**40%**), with the use of television as a prime preventive measure selected by **46%** of the public who replied to the question on road safety education.

If road safety education is to commence from an early age (Michon, **1981**; Limbourg & Gerber, **1981**; HORSCORS, **1984**), then the development of suitable road safety education materials or the selection of existing effective materials is highly desirable. The opinion of the HORSCORS committee (**1984:230**) was that

If positive long-term attitudes to road safety can be developed through school based education then it is well worth devoting sufficient resources to develop educational material of a high standard and suited to a wide range of children.

At present, all Australian States and Territories include road safety education to varying degrees in the Health or Social Education Curricula for Primary schools. In spite of this fact, there are considered to be inadequacies in the current teaching of safety (in general terms) to Australian school children, in relation to course content and allocation of time (Pearn, **1984:538**). Road safety education materials do exist. Some have been implemented widely and others have tended to remain on shelves. Most problems in road safety education require the careful analysis of both empirical and instructional issues. That is, information from experience and experiment, together with the latest knowledge of methods for designing effective instruction should be paramount when developing and evaluating materials for school road safety education. From this perspective materials could be developed at the national level suitable for use by the States and Territories.

The report of the HORSCORS (1984:240) stated that

There is at present a considerable amount of duplication as each state develops its own program to address problems experienced nationally....through coordination, better use can **be** made of limited resources with better road safety programs as the end product.

The present school road safety research project was set up as a national project to explore and describe the current state of road safety education in Australian schools. The following section discusses the purpose and scope of the project.

1.2 Purpose of the Project

The Federal Office of Road Safety, within the Federal Department of Transport, commissioned Futuretech Pty. Ltd. to undertake a national school road safety research project, titled "Primary School Road Safety Curricula - A Review of Australian Materials and Practices".

The original specification, included in full as Appendix A, states that

The school system is considered to be a major avenue for promoting road safety in Australia... Road crashes are the largest single cause of death for school age children, and the school system is one way of reaching most children...yet little is known about what is taught in schools, how it is taught, the problems teachers have, and their expectations.

The objectives for the project were fourfold and included the following:

1. To collate all major road safety programs that are used in Australian schools...
2. To determine the extent of use in schools of existing programs, and to determine the quality with which they are taught.
3. To prepare two major sets of guidelines for the design of school road safety curricula... The term school refers to pre, primary and secondary schools...
4. Prepare a report describing and commenting on the results obtained from the study.

It was necessary to limit this school road safety research project to an analysis of the development and implementation of road safety education materials for primary schools in Australia. This decision was made **for** the following reasons:

1. Although 'pre-schools' was the logical starting point for the continuous study of road safety education across the formative years, the road safety authorities across Australia have not, as yet, developed major road safety materials specifically for this age group.

2. The term 'pre-school' covers a wide variety of care centres for children from a few months of age up until they begin primary schooling. Pre-schools are not often attached to education department schools, and do not have a formal body of knowledge and behaviours which teachers are expected to develop in their charges.

3. Contacts had been made with the road safety authorities as well as the Education Departments in the capital cities of Australia. It was felt by them that road safety education was expected to take place in some form in primary schools across Australia. With time limitations on the project, it was decided to analyse the development and implementation of road safety education materials only for primary schools. This decision would in no way impede a future analysis of the pre-school and secondary situations.

The project analysed the development and implementation of primary school road safety education materials for the following road safety categories:

- Pedestrian Safety
- * Bicycle Safety
- * Restraint Usage
- * Alcohol and Safety

It was known that programs had been developed for pedestrian and bicycle safety, although it was not known how widely these were used in schools. Neither was it known whether programs for restraint usage and alcohol and safety were being developed for, or were in use in Australian primary schools. Moreover it was not known if the programs were effectively developing road safety knowledge and behaviours in children.

This school road safety project was the first attempt to explore and describe the development and implementation of primary school road safety education across Australia. Before the project is presented in detail, it is necessary to consider two areas of research. Firstly, child road crash data and secondly, child road safety education studies. The remainder of this chapter will briefly consider some aspects of child road crash data and Chapter Two will present child road safety education studies.

It is not the purpose of the project to give a detailed analysis of children and road crashes. For an analysis of road crashes in child (0-16) death and injury, the reader is referred to Elliott, (1985). However some mention should be made of the difficulties experienced in gathering and interpreting child road crash data. The following section discusses these issues.

1.3 Child Road Crash Data.

It should be emphasised that national and international child road crash data is difficult to interpret for a number of reasons. Firstly, methods for data collection differ significantly from country to country (OECD, 1983:15) or from year to year (Elliott, 1985:15). Secondly, definitions used for certain accident terms are also at variance as is the recording of the data. Thirdly, methods of analysis are equally at variance - age groupings differ between countries or change within a country. Lastly, there is a universal problem of Incomplete data. Evidence suggests that in several countries only 25-50% of all hospitalised road crash victims are reported to the police (OECD, 1983:13), whilst in Australia the problem of unreported crashes is discussed in a recent report by Elliott (1985:8).

To combat the above problems, international attempts are being made to set up co-ordinated police and hospital registration (OECD, 1983:13). For Australian data the HORSCORS (1984:64) report suggests that

A set of standardised statistics should be devised and collected throughout Australia to provide a more substantial road safety data base for Australia.

The problem of standardising data gathering is currently receiving attention at the State and national levels. The nature of the problem of interpreting crash data makes it difficult to use a reduction in the number of crashes as a measure of the effectiveness of an education program. However, it is possible that the primary goal of road safety education is not to reduce the number of crashes, rather,

To produce competent road users, people able to take their place in our traffic system... direct accident reduction is a secondary goal... rather than the sole criterion on which evaluation should be based.

(Johnston, 1983:2)

Keeping in mind the difficulty of interpretation of road crash data, the following table is included to give some measure of the extent of child road crashes in Australia. Table 1.1 represents the contribution of each age sub-group to the road user category for Australian child (0-12) deaths for 1981, 1982, 1983.

Table 1.1

Number of Child (0-12) Road Deaths for Australia for the Years
1981-1983 for the Three Road User Categories
Percentages Shown in Brackets

Age	Pedestrians			Cyclists			Passengers		
	1981	1982	1983	1981	1982	1983	1981	1982	1983
0-4	38(37)	47(48)	20(27)	2(5)	1(4)	5(15)	43(52)	45(44)	42(54)
5-7	35(34)	29(29)	24(32)	14(32)	13(46)	9(26)	18(22)	22(21)	18(23)
8-12	30(29)	23(23)	30(41)	28(63)	14(50)	20(59)	22(26)	37(35)	18(23)
Total:	103(100)	99(100)	74(100)	44(100)	28(100)	34(100)	83(100)	104(100)	78(100)

Source: FORS Fatal File 1981, 1982, 1983.

From the figures (Table 1.1) it can be seen that a large number of Australian children (0-12) are being killed each year on the roads as either pedestrians, passengers or cyclists (230 in 1981; 231 in 1982; 186 in 1983). For the primary school age child (5-12) there were 147 killed in 1981; 138 in 1982 and 119 in 1983. In total, the pedestrian and passenger casualties, each account for approximately 42% of the child road deaths and cyclist casualties account for approximately 16%.

Further observation within the age groups for each road user category shows that 0-4 year olds are highly represented in the passenger casualties (approximately 50%). In addition, this age group accounts for more pedestrian deaths, in the total of the three years reported, than each of the other two age groups. The 5-7 year olds are highly represented as pedestrians, and to a lesser extent, as passengers or cyclists. The 8-12 year olds are mostly affected as pedestrians and passengers. However, viewing across the age groups, it can be seen that approximately 60% of the bicycle deaths occur among children in the 8-12 year range.

If the number of children seriously injured each year is twenty to forty times the number killed (Elliott, 1985), and at least as many again are treated for less serious injuries, then it would be desirable to ensure that children be taught road safety behaviours. It is believed that all primary school children are taught road safety knowledge and behaviours at school. However little is known about what is taught, what materials are used, the effectiveness of the teaching and learning or the difficulties teachers experience. This project explores these issues.

In an attempt *to* train children in the area of road safety, many experiments have been conducted. The following chapter highlights the exploratory nature of these experiments.

CHAPTER TWO: CHILD ROAD SAFETY RESEARCH

It was stated previously that most problems in road safety education require the careful analysis of both empirical and instructional issues and yet Rothengatter (J. 1977:3) suggests that

Only a few attempts have been made to develop an instructional curriculum on the basis of empirical findings and theoretical considerations...many traffic teaching experiments have had little impact on teaching practice.

The limited impact of road safety research on the practice of road safety education can be attributed, in part, to the problems involved in applying the knowledge gained from the research setting, to the development *of* effective educational material. However, the notion of what constitutes 'effective educational material' has been elusive, and has only recently been analysed (Andrews and Goodson, 1980; Maggs, O'Brien and McMillan, 1984). Given what is now known of the learner and of learning behaviour, of systems of knowledge, and of qualities which an effective learning environment must contain, there should be little reason for instruction to be other than successful, stimulating and satisfying.

Prior to developing a model for the instructional design of school road safety education material, the following section will give an overview of the empirical findings from research into child road safety education. For a more detailed analysis of the area, the reader is referred to Rothengatter (J. 1977, 1981); van der Molen (1981) and Singh (1982).

2.1 Exploratory Nature of the Studies

The information that has accumulated in the last fifteen years can be best described as exploratory. The studies have attempted to explore child road safety from a number of perspectives, all of which pivot around the following two points:

1. Child road crashes

- who is having the crash: age, sex?
- when do the crashes occur?
- what factors emerge?
- where and how do children play?
- what child characteristics might influence the likelihood of a crash?

2. Child road safety education

- which method of instruction is successful?
- which instructional situation is successful?
- which media type is successful?
- how should the task be analysed?

As mentioned previously, it is not the purpose of this report to give a detailed analysis of child road crashes. However, data from this area is crucial in helping to define the content of instruction for educational programs.

Experiments which attempt to teach road safety to children vary widely in their choice of objectives, methods, design and subjects. Whilst the experiments are worthwhile in that they explore a particular area of road safety, and as a result suggest hypotheses for future studies to address, they suffer, in the main, from methodological problems which hinder the accumulation of 'hard facts'. Few studies to date have formulated behavioural objectives; few have distinguished knowledge from skills to be developed; with a couple of exceptions, none have structured instruction from an analysis of content; only one has considered formative evaluation; and, although the majority of the studies use pre-test, post test designs, many pre and post tests bear little relationship to the instruction given to the children, or to the real life skills children need to possess to be safe on the road. The studies will be presented with these problems in mind.

The vast majority of the studies are concerned with child pedestrian safety. Fewer are concerned with bicycle safety and even less with passenger safety and restraint usage. Alcohol, as it relates to road safety, is rarely considered an educational issue for primary school children, and yet evidence would suggest that the primary school years are formative years for the development of the positive attitudes and values which form the basis from which later decisions can be made. The following section will consider pedestrian education studies.

2.2 Pedestrian Safety Studies

The early studies of child road safety education concentrated on comparing the effectiveness of a variety of training situations, a variety of methods of instruction and a variety of media for instruction. More recently the studies have turned towards analysing the pedestrian task and formulating behavioural objectives which can then be tested. However, no studies have considered the importance of analysing the content to be taught, so that the sequence of instruction is explicit and dependent on the type of information, knowledge and skills to be taught. The following section will consider the studies which compare instructional situations.

2.2.1 Instructional Situations

Considering that the learning outcome of road safety education has to be displayed in the traffic environment, the training situations used may be classified by their resemblance to the real traffic situation. The major comparisons used in the studies include: real traffic situations; real street situations which use real traffic situations without traffic; semi-real situations which use traffic gardens and test tracks; simulated street situations which use school yards and the classroom situation for instruction. In an attempt to bring order to the array of material available on pedestrian education, tables have been constructed which present information about: the author and country where research took place; the year the study was published; the age of the children in the study; and a brief description of the methods used and reported. The following tables give a brief review of the instructional situation studies.

Table 2.1

Studies which use Real Traffic Situations for Training Purposes				
Study	Year	Age Of Subject	Method	Results
Johansson (Sweden)				
Johansson (Sweden)	1967	7	1. Real traffic 2. School yard 3. Traffic garden 4. No training	Real traffic situation resulted in greater increase of correct behaviour than any other situation.
Saska (Sweden)	1971	6, 8	1. Real traffic 2. Traffic garden + real traffic 3. Traffic garden 4. No training	No difference between real traffic and combination of traffic garden and real traffic but both better than traffic garden alone. Differences larger for 6 year olds.
Reading (U.K.)	1973	up to 12	Real traffic + behaviour modification	Significant improvement in traffic behaviour from pre-test (10% correct) to post test (63% correct).
Nummenmaa Ruuhilehto & Syvänen (Norway)	1974	6	1. Teachers instruct by means of slides. Parents trained children in real situation using items on slides. 2. No training	Formative but no summative evaluation information. Suggests positive effects.
Heinrich & Langosch (Germany)	1976	6	1. Real traffic + classroom discussion before and after training. 2. Conventional classroom traffic education. 3. Conventional classroom traffic education.	Measured traffic knowledge test + GSR reaction to risk perception. Significant increase for real traffic group on traffic knowledge after training. No differences GSR test.
Limbourg & Gerber (Germany)	1978	3 - 7	Parents trained to teach tasks in real traffic.	Pilot experiments - no statistical data but observational data suggest positive effect.
Rothengatter & Brakenhoff-Splinter (The Netherlands)	1979	4	Parents trained to teach road crossing tasks in real situations.	Parents can successfully influence children's crossing behaviour.
Rothengatter, Talib (The Netherlands)	1984	4 - 5	Practical training real traffic + social learning theory + behaviour modification techniques. a 4-5 year olds parent trained b 4-5 assistant trained c 4-5 control a 5-6 year olds parent trained b 5-6 assistant trained c 5-6 control	Pre, post behavioural test showed considerable improvement in those behaviours trained but no transfer to behaviours not trained.

(Studies cited by Rothengatter, 1981:241-253)

It would seem that the real traffic situation is most effective in developing selected road safety behaviours in children. However, this generalisation may not be suitable for all tasks and a more specific analysis of the content of instruction may be appropriate. A model which allows for this specificity will be suggested in section 4.3.2. It is interesting to note that the later real traffic situation studies include aspects from learning theory in the design of the studies.

Table 2.2

Studies which use Real Street Situations without Traffic				
Study	Year	Age Of subject	Method	Results
Sandels reported on:	1975			
1. Solna Study (Sweden)	1965	5 - 7	1. Training indoors 2. Training outdoors (streets) 3. Training indoors & outdoors 4. No training	Pre & post tests of knowledge & behaviour. 1. No considerable improvement 2. Improvement 3. Considerable improvement 4. No difference
2. Vänersborg Study (Sweden)	1967	6 - 7	1. Traffic garden 2. Schoolyard 3. Real traffic 4. No training	Practical traffic tests in real situation. Pre and post behavioural tests showed all groups had made progress. Groups trained in real traffic and on school yard better than traffic garden group. Traffic garden group worse than no training group.
3. Täby Study (Sweden)	1969	6 - 7	1. Traffic garden 2. Schoolyard 3. Real traffic 4. No training	Pre and post tests as for Solna study. All groups improved - the best results were real street situation then schoolyard. No noticeable differences between traffic garden and control group.

(Studies cited by Sandels, 1975: 116-128)

As a follow up to the Swedish studies by Sandels (1975), it has been suggested by Bäckström (1982) that the following issues are now considered crucial in developing road safety behaviours in children:

- to teach a little at a time
- to teach it every day, with practice
- * to teach what the child should do
- to teach theoretically indoors for a short time, then pay more attention to
- the real situation outdoors
- * children who only get indoors education or traffic garden training cannot transfer the knowledge to the practical situation on the roads.

Table 2.3

Studies which use Semi-Real Situations - Traffic Gardens

Study	Year	Age Of Subject	Method	Results
Sandels reported on:	1975			
a) 1. Vänersborg (Sweden)	1967	6 - 7	1. Traffic garden 2. Schoolyard	Traffic gardens worse than no training in the Vänersborg study. No difference between the traffic garden and control groups. As previously stated, real traffic best.
a) 2. Täby (Sweden)	1969	6 - 7	3. Real traffic 4. No training	
b) Johansson (Sweden)	1967	7	1. Traffic garden 2. Schoolyard 3. Real traffic 4. No training	Real traffic best - no difference other three.
b) Saska (Sweden)	1971	6, 8	1. Real traffic 2. Traffic garden + real traffic 3. Traffic garden 4. No training	All better than no training. Traffic garden + real traffic superior to traffic garden alone.
b) Colborne (U.K.)	1971	6 - 7	1. Traffic garden 2. Classroom Instruction using table top model	Behaviour tested traffic garden. Traffic garden significantly better than classroom instruction for 6 year olds: no difference 7 year olds. Test took place in traffic garden in same place as for group trained there. No we-test included.
b) Nummenma & Syvänen (Tampere Studies) (Norway)	1974	6	1. Traffic garden + film in classroom. 2. No training	Traffic garden + film superior to no training when knowledge and behavioural test carried out.
Manders & Hall (Aust.)	1984	Questionnaire to teachers	1. Road safety program in schools 2. Teacher's view of traffic school lesson 3. Significance of traffic school lesson 4. Amount of follow up work stimulated	1. High support 99.4% believed in road safety being taught in primary schools although lessons incidental. 2. Lesson viewed favourably - needs follow up 3. Traffic school visit perceived as requiring follow up - in most cases visit is part of road safety program 4. Would appear that teachers became more aware of road safety issues. No measure of child's gain in knowledge or behaviours is reported.
Heywood (Aust.)	1983	Preschool Primary Secondar	Theory & practice of selected pedestrian & tricycle, bicycle + pre driver education knowledge & skills.	No pretest, intervention or maintenance data available

a) Studies cited by Sandels 1975

b) Studies cited by Rothengatter. 3. 1981

General methodological considerations which should be taken into account when designing studies have often been overlooked or inadequately described in the Traffic Garden studies. These include such things as how the sample of children was selected and grouped, how the groups were treated and tested, how the instruction was standardised and the observations recorded and analysed. For example, in Sandels' and Colborne's studies (Table 2.5), post-tests take place in situations identical to one of the experimental conditions. This factor will inevitably bias the results of the study as it could be expected that the groups trained in the same situation as they are tested in would do better than groups trained in another situation. The above factors make it difficult to generalise from the studies, which are, in the main, pilot studies concerned with the preparatory phase of research carried out to clarify certain problems. The results from this preparatory phase should give direction to later research, by enabling hypotheses to be formed which can then be tested in other situations.

Only when further research is carried out in traffic gardens and 'real' situations which gives the same results can statements be made about the effectiveness or otherwise of such situations.

The implicit assumption that copying aspects of the real street situation will make the traffic garden or simulated street situation (Table 2.4) a real street situation may not be true. No experiments have been carried out to investigate which factors are most important and it is obvious that some road safety behaviours cannot be learnt in the traffic garden or the simulated street situation. For example, choosing the right moment to cross; judging the distance and speed of oncoming vehicles. Other objectives such as knowledge and physical control in traffic seem to be attainable by a combination of theoretical instruction and practical training in specific situations, according to the objectives of the learning.

Table 2.b

Studies which use Simulated Street Situations

Study	Year	Age Of Subject	Method	Results
Sandels (Sweden)	1975	6 - 7	See previous tables	In all studies the training in schoolyards proved to be inferior to training in street situations.
Johansson (Sweden)	1967	7		
Dueker (U.S.A.)	1975	5 - 9	Crossing behaviour sequence trained. 1. Classroom = simulated struts reinforced practice. 2. Simulator programme = practice in traffic flow simulator. 3. Film sequence introduced and demonstrated using child prestigious personality.	Street blocked off to traffic used to test behaviours. Superiority of simulator & film over basic programme.

Studies using the classroom for instruction are hardly comparable as a great number of different methods have been used. Although studies comparing training in the classroom situation with training in other situations usually suggest the superiority of training in other situations (Sandels, 1975; Heinrich and Langosch, 1976) some results suggest that training in the classroom may be effective if certain media and teaching strategies are employed.

Table 2.5

Studies which use Classroom Situation for Training

Study	car	age Of Subject	Method	Results
Colborne (U.K.)	371	7	1. Slides and discussion 2. Table top model + discussion	Pre & post test in traffic garden. Slides appeared superior.
Sandels: Solna Study (Sweden)	175	7	1. Classroom 2. Street 3. Classroom + street 4. No training	Classroom group improved in knowledge but not behaviour.
† Nummenmaa Syvänen & Kotakorpi (Norway)	972	6	1. Film in classroom 2. Slider in classroom 3. No training	All experimental groups scored higher than controls on the knowledge test film. Behavioural test showed considerable incorrect behaviour.
† Valavuo (Austria)	176	8	1. Theoretical instruction 2. Theoretical instruction + feedback on children's behaviour recorded on video.	Both situations improved knowledge but second situation improved behaviour.
† Heinrich and Langosch (Germany)	976	6	1. Real traffic 2. Control 1 3. Control 2	Pre and post tests. Control groups significantly improved on a traffic knowledge test after traditional classroom instruction. Real traffic situation superior.
Firth (Tufty Club Study) (U.K.)	373	8	A. i. Tufty Club members 2. Non members 8. Tufty book C. Tufty stories read now and again.	A. Test using models to cross model track. No difference between members & non-members. 8. Significant improvement in performance after exposure to the Tufty book. C. No improvement.

† Cited by Rothengatter, 1981

From the results of the instruction situation experiments, it would appear that the real traffic situation is superior to all other situations for training road safety behaviours. Training in real street situations without traffic appears to be superior to training in traffic gardens or school yard situations. Training in semi-real situations (traffic gardens) appears less effective than the real situation, but more effective than training in the classroom, when behaviours are measured. There is no substantial evidence to suggest that simulated street situations are effective in changing either knowledge or behaviour. As for knowledge change, it would appear that any instruction is better than no instruction and that instruction is more effective if slides, films or models are used to assist the instruction.

However, as none of the reviewed studies incorporated a systematic variation of the instruction situations under otherwise constant conditions, and as some of the experiments have serious methodological drawbacks, no ~~firm~~ conclusions can be drawn.

In spite of the difficulties inherent in the studies, a number of factors have emerged which seem to be linked to the effectiveness of instruction, no matter what the situation might be. These factors include the following:

- * The content of instruction needs to be clearly defined.
- * Objectives need to specify knowledge and behaviours separately.
- * Sequence of instruction needs examination.
- * Media selection should be examined.
- Teaching strategies need to be clarified.
- * Evaluation of instruction as well as child performance needs to be built in.

Various methods have been used in the instruction of road safety. Studies have used verbal instruction, demonstrations of the required behaviours, practical training and certain teaching strategies (modelling, shaping, feedback and reinforcement) in an attempt to change knowledge and behaviours. The following section gives an overview of these methods.

2.2.2 Instructional Methods

In most studies, the methods of instruction vary during the training and may include discussion, demonstration, child verbalising, child performing, child being given feedback and reinforcement for verbal and/or physical responses.

Whereas there may be a variety of methods used, the choice of method does not appear to have been made on the grounds of what method is most likely to have the best effect on training. The following tables highlight studies which use various methods of instruction.

Table 2.6

Studies which use Verbal Instruction

Study	Year	Age Of Subject	Method	Results
Firth (Tufty Club Study) (U.K.)	1973	5 - 8	1. Story relating to traffic safety issues read. 2. No story.	Pre/post test showed no difference between the groups. In fact children had difficulty recalling story the next day.
Jolly (U.K.)	1977	9 - 13	1. Experimental group booklets + discussion + activities. 2. Verbal instruction only.	Significant difference between two grwps in favour of group 1. Verbal instruction only was a negative predictor of effectiveness.
Fisk & Cliffe (U.K.)	1975	5½ - 8+	1. Single lesson + slide 2. Single lesson + school-yard training. 3. Single lesson + model track.	Single lesson not separated as an experimental condition, therefore no data. The seven and eight year olds made much greater improvement from pre to post test than did the younger children.

The above studies would suggest that verbal instruction alone has little effect on learning. However it would seem that if children are actively involved in a road safety experience, the verbal instruction is enhanced.

Many studies have incorporated selected training strategies in their studies. These strategies include aspects of the following:

- * demonstration
- * practice
- * modelling
- * cueing
- * shaping
- * feedback and correction
- * mastery

Tables 2.7 and 2.8 present these studies.

d) Studies which use Demonstration of Behaviour

Study	Year	Age of Subject	Method	Results
Pease & Preston (U.K.)	1967	5	Models on film demonstrate kerb drill. Pre/post test to produce kerb drill when crossing simulated street in classroom with & without an imaginary car.	Models facing children looked left and right (opposite to children). Major problem of direction confusion for subjects. No improvement in behaviour between experimental and control groups
Nummenmaa et al. (Norway)	1972	6	Demonstration + verbal commentary	Repeated demonstrations most effective in terms of traffic knowledge scores. No effect on observed behaviour.
Nummenmaa & Syvänen (Norway)	1974	6	Demonstration + practical training	Did have positive effect on behaviour.
Dueker (U.S.A.)	1975	5 - 9	Demonstration on film.	Demonstration followed modelling principles in accord with social learning theory.
Limbourg & Gerber (1981:255-266) (Germany)	1978	3 - 7	Training programme 1. Film with models demonstrating 2. Brochure 3. Objectives sequenced 4. Mastery levels	Pre and post tests programme showed significant effect of training. Effects of demonstrations used in these programmes have not been tested separately.
Schreiber & Lukin (Aust.)	1978	3-8	Model on film demonstrates kerb drill.	No effect of film on either recitation of kerb drill, behaviour or notion of left and right of children tested in simulated traffic situation.
Rothengatter & Brakenhoff-Splinter (The Netherlands)	1979	■	Parents trained to demonstrate tasks to children.	Significant effect of training. Effects of demonstration not tested separately.
Rothengarter, T. (The Netherlands)	1984	■	Pilot experiment. Pre and post test assistants trained children.	Modelling, imitation and learning principles used effectively to modify traffic behaviour especially for acquisition of behaviour patterns.
Rothengarter, T. (The Netherlands)	1984	1 - 6 1. 2. 3. 4.	Pre & post tests knowledge & behaviour. Training incorporated four stages: 1. Modelling 2. Practice (together) 3. Practice (alone) 4. Observation & reinforcement	Transfer of training from one situation to another did not occur. Behaviours demonstrated in one situation did not transfer to another situation for the under 5 group. Significant improvement after Intervention.
Fortenberry & Brown (U.S.A.)	1982	5 - 7	Demonstrate & discuss why & how, draw comparative pictures.	Significant reduction in accidents. Elements of instruction not separated.
Embry & Malfetti (U.S.A.)	1984	5, 2, 3	Symbolic modelling of play safe behaviour.	Baseline and intervention with story books. Temporary improvement of street entering behaviour. Lack of positive reinforcement, too many reprimands may have 'enforced street entering behaviour.

The studies mentioned in Tables 2.1, 2.2 and 2.3 all reported that practical training, in a real traffic environment, was most effective in developing road safety behaviours. However, other studies have found that environmental conditions that affect training and subsequent behaviours need to be considered.

For example, Fisk and Cliffe (1975) found that the effects on training diminished if the child was distracted. Nummenmaa et al., (1975) included in their training the item 'tempting actions' whilst Sheppard's (1975) graded structure for pedestrian teaching included as Item 17, 'learn dangers of distraction'. Limbourg and Gerber (1981) argue that training has to be carried out under normal as well as distractive conditions to ensure that the training remains effective when the child is distracted. Furthermore, they have structured learning objectives hierarchically and expect mastery of each objective in the order presented.

It would seem then, that whereas practical training is effective in developing road safety behaviours, any educational program would need to incorporate 'distractive conditions' when setting behavioural objectives.

Other studies report success when training strategies are defined and implemented. The following table lists some of the studies using these strategies.

Table 2.8

Studies which use the Training Strategies of Modelling, Cueing, Shaping, Feedback and Mastery

Study	Year	Age Of Subject	Method	Result
Reading (U.K.)	1973	-> 12	Multiple baseline/intervention lecture and discussion. Appropriate behaviour demonstrated + role playing. Positive reinforcement of appropriate behaviour reinforced verbally + sweet + smile + good pedestrian citation.	Significant improvement after intervention.
Dueker (U.S.A.)	1975	5 - 9	1. Classroom - simulated street-reinforced practice. 2. Simulator programme - practice in traffic flow simulator. 3. Film sequence introduced and demonstrated using child prestigious personality.	Aquisition stage - prompting, modelling. Stabilise stage - positive reinforcement + mild punishers. Significant increase in appropriate behaviour in the real traffic situation.
Rothengarter & Brakenhoff Splinter (The Nether Lands)	1979	4	Pre and post test + intervention using feedback, modelling & positive reinforcement.	Pre test scores high - no significant improvement at post test although scores improved.
Valavuo (Austria)	1976	7 - 8	1. Group discussion + video playback feedback on own behaviour. 2. Verbal instruction.	1. Knowledge and behaviour improved. 2. Knowledge improved.
Limbourg & Gerber (Germany)	1978	3 - 7	Program - media package: film, brochure - instruction - objectives - mastery assess behaviour	Significant effect of behavioural training on pedestrian behaviour.
McKelvey (U.K.)	1978	5 - 12	Active caution response added to kerb drill utilising cues and feedback. Colour films as media.	Pre test post test show preliminary evidence that information feedback will accelerate learning of the safe interval discrimination habit. Suggest also graded materials.
Rothengatter (The Nether Lands)	1984	4 - 6	Practical training + social learning theory principles + learning theory - phases of modelling, guidance, prompting, chaining & feedback. Reinforcements used as maintenance technique.	Pre & post test significant improvement after training.
Embry & Malfetti (U.S.A.)	1981	3, 4, 5	Symbol in story book modelled correct behaviour.	Package succeeded in altering all the targeted behaviours of participating children & their parents.
Embry & Malfetti (U.S.A.)	Unpubl	3 - 5	Parents taught to conduct program for their child using praise and reward.	Parents were able to successfully train behaviours.

In conclusion, it would appear that most successful instruction methods include verbal instruction. However, this method alone has limited value, but when combined with suitable media, behavioural objectives which take into account conditions likely to affect behaviour, and the training strategies of explanation, demonstration, modelling, cueing, shaping and feedback of behaviours towards mastery, then significant improvement in knowledge and behaviours can be expected.

2.2.3 Media Selection

The types of media used in road safety education range from audio, visual, audio-visual to tactile. The most effective are those that encourage a two-way medium, e.g. one way medium such as film supported by a feedback medium such as an instructor or a practical exercise (Nummenmaa and Syvänen, 1974; McKelvey, 1984).

To date, the proliferation of visual media in the form of printed material would constitute the major type of media for teaching road safety. Yet the effects of printed material seem very much dependent on other factors such as the objectives of the training and the effectiveness of the training strategies (Colborne and Sheppard, 1966; Firth, 1973; Vernon, 1962; Sheppard, 1975; Embry, 1984; Maggs and McMillan, 1985).

Media such as table top models, slides, films and videos have been used in an effort to develop knowledge and behaviours in children. However, as Singh (1982:75) suggests

Evaluation of audio-visual and printed materials for pedestrian safety education purposes are rarely attempted at the time of production...Fortunately, a few evaluations are now being made of these materials, but the nature of these evaluations is still rather limited.

There is no substantial evidence that the use of table top models significantly affect road safety behaviours (Colborne, 1971; Boyle and Gilhooly, 1972) and less evidence to show that testing children's knowledge or behaviour with a model track is appropriate. Both these factors may be affected by the age of child. However, the use of slides (Colborne, 1971; Nummenmaa and Syvanen, 1970; Nummenmaa et al., 1972) does suggest increase in knowledge, but no effect on the behaviours of the children tested.

Several studies have used film as a medium of instruction. Some researchers found film had no effect, or even a negative effect, on knowledge and behaviour (Pease and Preston, 1967; Schreiber and Lukin, 1978). The films in question either confused children's idea of direction, or had their message so hidden that children were unaware of the purpose. The use of video tape to provide feedback on road safety behaviours of 7 - 8 year olds has been documented by Valavuo (1976). In this study the children saw themselves on video, and were involved in group discussions of the observed behaviours. This process was superior to a verbal instruction process alone.

Several researchers (Colborne and Sheppard, 1966; Firth, 1973; Vernon, 1962; Sheppard, 1975; Rothengatter, J. 1981) have considered children's difficulty in correctly interpreting road safety posters, pamphlets, slides and films, suggesting that the following factors should be considered:

- * one poster should be broken into a series of posters
- * learning aids should be discussed - in fact the content of the aids should be taught
- * Vocabulary should be suitable
- * without explanation, comprehension is often limited, particularly for child up to 6 years
- * to be effective, specific media should be selected for each objective in the instruction sequence
- * if instruction is via media, then training strategies should be evident in the presentation of the content.

2.2.4 Content Analysis and Formation of Objectives

Although in the earlier studies specific behavioural objectives and the structure of content and instruction were rarely explicit, the more recent studies (Sheppard, 1975; Nummenmaa et al., 1975; Limbourg and Cerber, 1981; Rothengatter, 1981; van der Molen, 1981; van der Molen et al., 1981; McKelvey, 1984) are specifying facets of the instructional process. Tasks are being analysed (van der Molen, 1981; Vinje, 1981); objectives are being operationalised (van der Molen et al., 1981; Limbourg and Gerber, 1981; Rothengatter, 1981) and structured hierarchically (Sheppard, 1975; Limbourg and Gerber, 1981) and content is being analysed in that knowledge and behaviours are being separated (Vinje, 1981; Michon, 1981) and sequences produced (van der Molen et al., 1981; Limbourg and Cerber, 1981).

Training strategies are receiving much attention (Limbourg and Cerber, 1981; Rothengatter, T. 1981, 1984; Singh, 1981; McKelvey, 1984; Embry and Malfetti, 1984; Van Houten et al., 1985) and would appear to be significant in developing positive road safety behaviours.

Although no study to date has attempted to combine all the above facets of the instructional process, evidence is accumulating from the separate areas which will enable future research to develop, implement and evaluate road safety programs using effective instructional design of the material which will comprise the program.

Pedestrians are but one road user category. Other road user categories have **also** been investigated by researchers, in order to develop educational material. The following Section considers bicycle safety studies.

2.3 Bicycle Safety Studies

Bicycle sales in Australia have been increasing steadily for twenty years and have doubled in the last decade (Parker & Gately, 1984). Yet studies of bicycle use and safety are hampered by a lack of data (Mathieson, 1984). The availability of statistical information on bicycle crashes is minimal compared to other forms of transport (HORSCORS, 1978), and the data that is available significantly underestimate the extent of bicycle crash involvement (Elliott, 1985).

It **has** been stated previously that studies attempting to explore child road safety do **so** from a number of perspectives, all **of** which pivot around the following two points:

1. Child road crashes
2. Child road safety education.

Studies have been undertaken in relation to the following concerns:

1. Child road crashes:
 - who is having the crash: age sex?
 - when and where do crashes occur?
 - what factors emerge?
 - where and how do children play?
 - what child characteristics might influence the likelihood *of* a crash?

2. Child bicycle safety education:

- what should be taught?
- how should it be taught?
- to whom should it be taught?

In spite of the problems of inadequate data banks, analyses have been made of the available data on child bicycle crashes (Geelong Bikeplan, **1977**; Cross, **1978**; Gonski, **1979**; McLean, Brewer and Sandow, **1979**; Brindle and Andreassend, **1984**; Elliott, **1985**). Information from these reports should be, and in some cases has been, considered in detail when defining the content of instruction for any bicycle safety program.

Child bicycle safety education studies are few, and in the main have not led to an accumulation of information leading to a body of knowledge related to successful design of instruction for bicycle safety education for children. In contrast to the pedestrian studies discussed previously, bicycle studies have not been developed to effectively compare instructional methods, instructional media, training strategies or methods of evaluation. Those studies which do attempt to consider the effects of training have set up situations to compare such aspects as on-road versus off-road training. These studies are presented in Table **2.9** and point to the success of training versus no training in developing bicycle safety knowledge and behaviours in children. They also suggest that on-road training is better than off-road training for developing certain skills, such as traffic search skills, but that off-road training is acceptable for other skills, such as starting and stopping skills. All studies compared riding performance and in some cases bicycle safety knowledge before and after training. Yet no study has as yet considered evaluating the design of the instruction for bicycle safety education. Neither has any study developed comparative analyses of the content of bicycle safety programs, analyses of age or content suitability, analyses of instructional objectives, training strategies, media selection or evaluation techniques.

Table 2.9

Bicycle Education Studies

Study	Year	Age Of Subject	Method	Results
Wells Downing & Bennett (U.K.)	1979	8,9,10	<ol style="list-style-type: none"> 1. On road training 2. Off road training 3. Control group 	<p>Pre test, post test 1, post test 2, performance only. On road training produces better performance than off road training. Off road training produced errors related to traffic search.</p> <p>Both methods reduced the number of errors made. Worst group were the 8 year olds.</p>
Preston (U.K.)	1980	10	<p>Compared accident rates of:</p> <ol style="list-style-type: none"> 1. Those who had passed Cycling Proficiency Training (CPT) scheme 2. Those who had not been trained 	<p>Percentage of males who had accidents having passed CPT 44% of those not trained 70% had accidents.</p>
Trotter & Kearns (Aust.)	1983	10	<ol style="list-style-type: none"> 1. Classroom bicycle safety instruction & off-road on-cycle training 2. Classroom instruction on-road & off-road on-cycle training 3. Control group 	<p>Pre test post test knowledge & behaviour (simulated road environment).</p> <p>Group 2 significantly better on both tests than either 1 or 3.</p> <p>Group 1 significantly better than control group 3.</p>
Kearns & Rothman (Aust.)	1983	10	<p>Follow up study of above study -</p> <ol style="list-style-type: none"> 1. Off-road, minimised maintenance 2. Off and on-road on-cycle 'Bike-Ed' 3. Original control group 4. Naive control group 	<p>Riding knowledge pre, post, follow up tests.</p> <p>All 3 groups (1,2,3) improved from post test to follow up. No significant differences 1 & 2. significant improvement group 3.</p> <p>All 3 groups unproved significantly pre test to follow up. Group 2 significantly better than other groups. No significant difference 1 and 3. Group 3 significantly better than group 4. Performance: Group 1 and 2 significantly better than group 3 and 4 although initial benefits of lull Bike-Ed program lost over time.</p>

The few bicycle education programs that are available for use in Australian schools will be discussed in Chapter Four. Suffice it to say at this point that for children in the Infants' or Junior Primary sections of primary schools there are no known programs to teach bicycle safety knowledge or behaviours. Yet the data from bicycle use and accident studies would suggest that very young children are riding two wheelers and that fifty per cent of children injured in crashes are between five and nine years old (Gonski, 1979: 270).

This being the case, it would seem that some form of education should commence at an early age - at least age five (Ryhammar & Berglund, 1980; Arnberg et al., 1978; Cross, 1978; Gonski, 1979, 1983; Child Safety Centre, 1984). Once again it should be stressed that researchers and program developers must look to evidence from sources such as crash data analyses when defining the content area for instructional programs.

Child bicycle safety education studies are few, and yet even less material is available for child restraint usage. The following section considers restraint usage studies.

24 Restraint Usage Studies

From Table 1.1 it can be seen that the total number of children (0-12) killed on the roads as passengers is similar to the total number of children killed as pedestrians. A closer look at the age categories would show that the (0-4) year old passenger category contains approximately 50% of those killed and the (8-12) year old category almost 30% if the mean percentage of the figures for 1981-83 is calculated. Despite the effectiveness of restraints in reducing the risk of death and injury in motor vehicle accidents (Lane, Milne and Wood, 1983), many children still travel unrestrained (Elliot, 1985: 188).

Legislation has been effective in increasing the use of restraints by adults (Fleming, 1981; Freedman & Lukin, 1977; Lane, Milne & Wood, 1983; Booth, 1983), but has not been successful in increasing children's restraint usage. While 80-90% of adults use restraints (Wittingslow, 1983; Lane, Milne & Wood, 1983), the rates for children are lower and vary with age. In Sydney in 1983/1984, restraint use for children was 77.3% for six months to four years, 46.4% for four to Seven years (Booth, 1983), and 54.2% for eight to thirteen years (Schnerring and Norrish, 1984).

Intervention programs designed to increase child restraint usage have employed various methods. These have included the education of mothers (Bowman, Sanson-Fisher & Webb, unpubl.) and mass media campaigns (Lane, Milne & Wood, 1983; Freedman & Lukin, 1981). There has only been one children's intervention program, with the aim of modifying child behaviour (Bowman, Sanson-Fisher & Webb, unpubl.).

This study was aimed at pre-school children and consisted of assigning 740 children to one of three groups as follows:

1. Control Group
2. Intervention Group - Parents co-erced
3. Intervention Group - Children's behaviour modified

The coercive intervention was aimed specifically at parents and employed the following items to encourage parents to restrain their children:

1. Letter to parents outlining legislation concerning the wearing of safety restraints by children, and containing threats of random checks.
2. Pamphlet supplying information about child restraints.
3. Posters.
4. Reminder cards pinned to the children's clothing or put into their lunch boxes.

The educational intervention was aimed at pre-shool children with the intent that they be taught to educate their parents. It was presented to pre-school directors in kit form which included:

- 1. Copies of six different drawings featuring cartoon characters.
- 2. Two brief songs.
- 3. Rubber stamp which read "Seat Belt Safety".
- 4. Two modified lap seat belts fitted to pre-school chairs.
- * Teachers were to create their own programs.

The result of the study are presented in Table 2.10.

Table 2.10

<i>Croup</i>	<u>Pre-Intervention</u>	<u>Post Intervention</u>
Control	59.9 (221)	60.3 (268)
Coercive	59.9 (260)	62.8 (252)
Educational	60.6 (259)	75.0 (231)

T-Tests were calculated for the control, coercive and educational groups to compare Pre and Post intervention scores. A small non-significant rise occurred in both the control and coercive groups, whilst a significant rise was found for the education group. An increase of fifteen per cent occurred for children in the educational group, after only a brief two-week Intervention.

This study has demonstrated the effectiveness of educating pre-school children about the needs to wear safety restraints. The author suggests (Bowman, Sanson-Fisher, Webb, unpubl: 17):

Educational interventions for children are likely to be most effective when they are introduced while the child is young ... The potential for conducting interventions in educational institutions has not been appreciated fully. There is enormous scope for implementing health and safety programs ... at all levels of schooling.

... co-operative efforts at the National level are essential to identify the most effective education and intervention program to combat both drink-driving and other drug-driving.

If alcohol education needs to occur at an early age before attitudes and alcohol use patterns develop into an established mode of behaviour, then it would seem appropriate to identify and define the content to be included in such a course. Decisions as to what is to be taught can be facilitated by the use of techniques such as needs analysis (is there a need?), tasks analysis (what should the children know and be able to do?), performance measurement (what do the children know? - what do they do? - what programs are taught?)

Answers to questions such as those raised above can best be gained by techniques which include gathering information on the performance measurement. That is, what do primary children know? What do they do? What programs are taught?

There are no State or national data available on 'what children know' about alcohol or (with the exception of the Life Education Centres programs K-6), what programs are taught to children. As far as 'what children do' in relation to alcohol consumption, a body of information is beginning to form as a result of surveys conducted in areas of Australia. This information will provide an empirical base from which relevant social policy and educational initiatives can begin to be determined.

There are relatively few large scale surveys concerned with alcohol consumption amongst primary school children and none in serial form which would allow the estimation of trends. In Australia, five surveys have included primary school children in their investigations of the use of alcohol and other drugs. The following tables present these surveys.

Survey Of Alcohol Use By Primary School Students

Study	Publication Year	Age of Subject	N.	State	Results Percentages
McClure	1975	Mean 11.3	530	Queensland Grade 6	69.0 Reported Alcohol use on other than religious occasions. 31.0 Currently using some form of alcohol. 27.0 Experienced being drunk or ill due to alcohol at least once. 10.0 Had attempted to drink in hotels.
Irdes et al.	1981	Years 5 & 6	6,224 3188 = M 3036 = F	NSW Hunter Region	M. F. 10.4 17.8 Never consumed alcohol. 44.1 50.0 Had a drink in the last month. 26.4 22.6 Had a drink in the last week. 14.3 6.0 Regular drink. 1.7 0.7 Drink daily.
W.C.T. Health Commission	1984	Grade 6	790	A.C.T	90.0 Reported some alcohol consumption. 71.0 Involvement amounted to a few sips. 83.0 No drinks during last week. 13.0 Four drinks or less during last week.
Shean	1985	Year 7	3020 adol. 512 prim	W.A.	M. F. 25.0 16.0 Consumed alcohol in past week.
Thompson et al.	1985	10-12	693	NSW	See following Table.

Table 2.12

Alcohol Consumption By Age and Sex
(Table from Thompson et al. 1985:14)

Age	10		11		12	
Sex	Boys	Girls	Boys	Girls	Boys	Girls
n =	88	91	188	161	89	76
Never	17.6	18.5	15.3	18.7	8.9	19.7
Tried	38.8	47.8	26.7	42.5	35.6	36.8
Recent	22.4	17.4	29.0	17.5	23.3	22.4
Regular	21.2	16.3	29.0	21.3	32.2	21.1

The great majority of the Thompson et al. sample (approximately **85%**) had tasted alcohol at some time and approximately one-quarter claimed to have had a drink in the past week. Alcohol is considered by a quarter of the children to be easily obtained either from parents or others (siblings or friends), or they simply take the drinks themselves.

Comparison of the Hades et al. (1981) and the Thompson et al. (1985) data would suggest that a greater proportion of the Thompson et al. sample reported regular alcohol consumption.

Table 2.13

Comparison of the Prevalence of Alcohol Consumption amongst Primary School Students (Years 5 and 6) reported by Hades et al., (1981) and Thompson et al., (1985).

Level of Use	Hades et al. 1981		Thompson et al. 1985	
	Male (N = 3188)	Female (N = 3036)	Male (N = 363)	Female (N = 328)
Never	10.4	17.8	14.0	18.9
Tried	44.1	50.0	31.2	42.7
Recent	26.4	22.6	25.5	18.6
Regular	14.3	6.0	27.4	19.8
Daily	1.7	0.7	1.1	0.9
Incomplete	4.8	3.6	1.9	-

From the analysis of the data gathered by the five surveys, certain features appear in the pattern of alcohol consumption which signal potential problems. These include the following:

- * The Turner and McClure (1975) survey found that **27%** of the Grade 6 drinkers experienced being drunk at least once, or being ill due to alcohol.
- * **Ten** percent of the Grade 6 drinkers (Turner and McClure) had attempted to drink in hotels.
- * Shean (1985) reports that for twelve year olds at least a few sips of alcohol was standard behaviour.
- * In all studies alcohol involvement (amount and frequency of drinking) was greater for males than females. However, this difference would appear to be diminishing as the comparison between the Hades et al., (1981) and the Thompson et al., (1985) data suggests.

- A comparison of the results of the Hardes et al., (1981) and Thompson et al., (1985) studies would suggest that a greater proportion of the Thompson et al., children surveyed - both male and female - reported regular alcohol consumption suggesting that alcohol involvement for primary school children is on the increase.

Results from the study by Homei et al., (1984) for the NSW Drug and Alcohol Authority are presented in order to show the pattern of the extension of alcohol use from primary to secondary school students in NSW.

Table 2.14

Percentage of 12-17 Year Old Males and Females who Use Alcohol Weekly

	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs
Males	14.3	20.9	31.8	44.8	58.6	57.4
Females	11.8	18.0	35.0	41.5	53.4	59.2

(Homei et al., 1984:7)

Table 2.15

Percentage of 12-17 Year Old Males and Females Drinking Five or More Drinks in a Row in the Past Two Weeks

	12 yrs	13 yrs	14 yrs	15 yrs	16 yrs	17 yrs
Males	10.5	16.8	25.6	33.6	45.6	47.3
Females	8.6	10.4	25.0	30.1	45.2	43.1

(Homei et al., 1984:10)

From Tables 2.14 and 2.15 it can be seen that:

- * More than 10% of children as young as twelve (the youngest age in the survey) are drinking alcohol regularly.
- After the age of fourteen years, there is little difference between male and females in the level of drinking.
- By the time children are sixteen years, over 50% are drinking alcohol on a weekly basis.
- * By the age of sixteen years, nearly half the children report having had five or more drinks in a row at least once in the past two weeks.

Evidence is accumulating about 'what children do'. This evidence can and should be used when alcohol and road safety program development is commenced. However, it is one thing to have the evidence of use of alcohol and quite another to design suitable instructional material to educate primary children and their parents about the use and abuse of alcohol and its relationship to road safety.

It is suggested by Wragg, (1984:2) that a sequential alcohol education program that has continuity over many years is required. Such a program should develop knowledge about alcohol and road safety as well as developing decision-making skills (Grant and Ritson, 1983:66) related to a pro-healthy lifestyle in order to develop appropriate behaviours in children. One such program has been piloted and field tested across three hundred classrooms (K-6) in the United States of America (Donovan et al., 1982). The results from the field testing suggests a significant positive change in knowledge and attitudes in favour of experimental groups of pupils at all grade levels. There is no evidence of such a primary school program in operation anywhere in Australia.

Interest in developing alcohol and safety educational material for primary school children is evident in many Departments of Education and Road Safety Authorities across Australia. As yet the only material prepared for and made available by the Department of Education for use in NSW primary schools is a booklet of ideas for drug and alcohol education for students in Years 5-8 (Wragg, 1984). This is not to ignore the Life Education Centre Programs K-6 which have been available in Sydney since 1979, and in mobile form since 1982. However, these programs, whilst gaining 97% teachers support (Gould, 1985:42) are only able at present to reach some children once a year at the most. It is hoped that classroom teachers would use the Life Education Centre program as a focal point around which to structure educational programs. Results from Gould's (1985) survey suggests that the average annual amount of time spent on Life Education Centre related activities was eight hours and twenty minutes. Half this time was spent on pre visit activities and half on post visit activities. This small amount of time would not constitute a sequential and co-ordinated program for alcohol and road safety education, although the Life Education Centre programs are an attempt to fill a gap in and a need for primary school alcohol education.

Children have been exposed to a variety of events, as researchers have aimed to clarify what children do, and what they can be taught to do when using the roads either as pedestrians, bicycle riders, passengers, or as potential drivers. The vast majority of studies have been concerned with pedestrian safety and have concentrated on comparing the effectiveness of a variety of training situations, methods and media for instruction. The more recent studies have endeavoured to analyse the pedestrian task, formulate behavioural objectives and training strategies, consider the role of media and build in methods for evaluation of child behaviours.

A number of factors have emerged from the **PEDESTRIAN STUDIES** which seem to be linked to the effectiveness of instruction. These factors include the following:

- * The content to be included needs to be clearly defined. This can be done through analyses of needs, of tasks, of the performance of the learner and through analysis of research studies.
- * Content once defined needs to be analysed in terms of knowledge to be learnt, and behaviours to be developed. Each of these areas then needs to be categorised so that a logical flow is developed.
- * Objectives need to specify knowledge and behaviours separately. Objectives should operationally define the situation, the action to be performed, the constraints under which action will be performed and the mastery level expected.
- * Teaching strategies need to be clarified. One such strategy, sequencing of instruction, needs examination and is closely related to the analysis of the content. Furthermore, sequencing should highlight the appropriate place for verbal instruction, demonstration of behaviours, practical training and the effective use of the training strategies of modelling, cueing, shaping, feedback and mastery.
- * Media selection should be examined. The most effective selections are those that encourage a two-way rather than a one-way medium. The effects of media seem to be dependant on factors such as the objectives of the training and the teaching strategies used. To be

most effective, specific two way media should be selected for EACH objective in the instruction sequence. It would seem from the research that children have difficulty in correctly interpreting road safety posters, pamphlets, slides and films unless they are selected for specific objectives in the instruction sequence. These resources should then be presented in sequences which include the purpose for the learning, and feedback to the children about their learning.

- Evaluation of instruction, as well as child performance, needs to be built in to the design of the instruction. If the objectives are written to specify the situation, the action to be performed, the constraints under which the action will be performed and the mastery level expected, then testing procedures which are congruent with the stated objectives can be constructed.

Although no pedestrian study to date has attempted to combine all the above factors which seem to be linked to the effectiveness of instruction, future developers of school road safety education materials would be advised to include these factors in their design of instruction.

Studies relating to BICYCLE SAFETY knowledge and behaviours are fewer than those for pedestrian safety. However, the studies do point to the success of training versus no training in developing bicycle safety knowledge and behaviours in children. All studies compared riding performance and, in some cases, bicycle safety knowledge before and after training. However, no study has considered evaluating the design of the instruction for bicycle safety education. Neither has any study developed comparative analyses of the content of bicycle safety programs, analyses of age or content suitability, analyses of instructional objectives, training strategies, media selection or evaluation techniques.

RESTRAINT USAGE studies which attempt to train children to use vehicle restraints are almost non-existent. However, the one study cited was successful in educating pre-school children to wear restraints. As passenger deaths and injuries seem to be on the increase in Australia it would seem that this content area is in need of definition and subsequent analysis. From this position, operationally defined objectives could be developed, training strategies specified, suitable media selected and evaluation procedures built into the design. There is no evidence of well designed restraint usage programs in operation in Australian primary schools.

ALCOHOL AND SAFETY studies involving primary school children exist only in so far as attempts have been made *to* gather data which will assist in defining the problem. To this end, surveys have been conducted in three Australian States and the A.C.T to determine primary school children's reported alcohol use. These studies have shown that children as young as ten are using alcohol and that by age twelve a few sips of alcohol is standard behaviour. Information such as this is crucial to developers and teachers of school road safety education as it helps to define the problems and to suggest the content area for instruction. Without this evidence, and evidence from related analyses of needs and tasks, developers and teachers are left to operate from 'gut feelings' or limited personal experience or else to spend inordinate amounts of time sifting through information which could be organised and presented to them for their use in designing instruction.

The factors which have emerged from studies of children in the four road user categories of pedestrian safety, bicycle safety, restraint usage and alcohol and safety suggest that the successful design of instructional material is dependent on an understanding of a number of principles of instructional design. These principles and a process model for instructional design will be developed in section 4.3 when the instructional design of the major primary school road safety education materials is considered.

All Australian States and Territories include road safety education to varying degrees in the Health or Social Education curricula for primary schools. In spite of this fact, there are considered to be inadequacies in relation to course content and allocation of time in the current teaching of safety to Australian primary school children (Pearn, 1984:538). Road safety education materials do exist, although many have tended to remain on shelves.

Chapter Three presents the methods and procedures used to explore and describe the development and implementation of primary school road safety education across Australia.

CHAPTER THREE: PROJECT METHOD

3.1 General Aim of the Project

The purpose of this project was to explore and describe the development and implementation of primary school road safety education across Australia.

The specific objectives were fourfold and included the following:

- * To collate the major road safety programs that are used in Australian primary schools.
- * To determine the extent of use in schools of existing programs, and to determine the quality with which they are taught.
- * To prepare two major sets of guidelines for the design of school road safety education, one set for developers of road safety materials, the second set for use by primary school teachers to help them select road safety materials.
- * To prepare a report describing and commenting on the results obtained from the study.

3.2 Project Design

In order to explore and describe the development and implementation of primary school road safety education across Australia, it was necessary to choose a method for collecting and analysing data that would allow the researchers

to determine the incidence and distribution of the characteristics and opinions of populations of people by obtaining and studying the characteristics and opinions of relatively small and presumably representative samples of such people.

(Kerlinger, 1979:151)

The researchers were not interested in manipulating variables or arranging for events to happen (Best, 1977:117). In fact, the events that were observed and described would have happened even if there had been no observation or analysis.

The use of surveys as a descriptive tool has been used previously to gather information about the extent and type of road safety education undertaken by teachers in schools overseas (Colborne and Sargent, 1971; Singh, 1976; Stephens, 1978) and in Australia, within the state of Victoria (Gardner, 1984; Manders and Hall, 1984) and Queensland (Brown, 1980). It was therefore considered appropriate to use this method to survey two populations - the population of developers of road safety education material and a sample from the population of primary school teachers across Australia. The surveys and the composition of the population and samples will be discussed in the following two sections.

3.3 Materials for Data Collection.

Two surveys were developed to provide data about the development and implementation of primary school road safety education in Australia for the following road user categories:

- * pedestrian safety
- * bicycle safety
- * restraint usage
- * alcohol and safety

The first survey (Appendix B) was to be completed by the population of people who were developing primary school road safety education material for Australian schools, and was designed to investigate the following areas within the stated road user categories:

- * materials currently being developed
- * information used in developing materials
- * information needs for future development of materials
- * dissemination of materials
- * materials already in use in schools

The second survey (Appendix C) was to be completed by a random sample of primary school teachers from across Australia and was designed to investigate the following areas:

- * The teacher's present road safety program
 - frequency and types of lessons
 - support people and materials used
 - school curriculum policy
 - parent involvement.
- * The teacher's future needs
 - preferred support materials
 - preferred support people.

Both surveys consisted of a combination of closed and open-ended items (Best, 1977:158). Closed items were selected as they are easy to fill out, take little time, are relatively objective and easy to code and analyse. Where appropriate provision was made for unanticipated responses by adding an other category. Open ended items were included to provide for greater depth of response where this was considered desirable.

The surveys were trialled using a variety of people. Both surveys were trialled using developers, teachers and researchers, until such time as the clarity of the items was acceptable, items objective, directions clear and complete, surveys short, and yet long enough to get the essential data, and easy to tabulate and interpret.

Each survey was placed in an envelope. This envelope contained not only the survey but in addition:

- stamped re-addressed envelope
- covering letter from the researcher (Appendix D)
- for the Teacher's survey, a covering letter from the Department of Education or road safety authority in the State or Territory.

Each of these items was included in an effort to encourage responses.

As well as gathering data by surveys it was necessary to gather all major primary school road safety education material from each State and Territory. Analysis could then be made of the materials, and the results linked to the respective items on the two surveys which ask for information about materials currently in use in primary schools. These major materials were sent to the researchers by either the road safety authorities or the Education Departments of the States and Territories.

3.4 Survey Subjects - Developers and Teachers

The subjects used in the project came from two populations. Firstly, the population of people who are currently developing primary school road safety education materials. It was possible, and desirable because of the small numbers of developers, to survey the total population of primary school road safety education material developers in either the road safety authorities or the Departments of Education. The number of developers is shown in Table 3.1.

Table 3.1

Number of Developers of Primary School Road Safety Education Materials in the Road Safety Authorities and Departments of Education Across Australia

State/Territory	No. of Developers		No. Returned		% Returned	
	R.S.A.	D.E.	R.S.A.	D.E.	R.S.A.	D.E.
NSW.	5	2	5	2	100	100
Vic.	7	4	4*	4	100	100
Qld.	1	-	1	-	100	-
S.A.	-	4	-	4	-	100
W.A.	3	5	1*	5	100	100
Tas.	1	-	1	-	100	-
ACT.	1	-	1	-	100	-
NT. (Darwin & Alice Springs)	2	-	2	-	100	-
	1	-	1	-	100	-
Total:	21	15	16	15		

* The difference between the number of developers and the number of surveys returned resulted from the four Bike Ed consultants in Victoria responding as a group and the three W.A. Officers responding as a group.

R.S.A = Road Safety Authority

D.E. = Departments of Education

Secondly, the population of primary school teachers across Australia. It was not possible or necessary to survey every primary school teacher. It was decided to select a random number of primary school teachers from each State and Territory. Table 3.2 presents the number of teachers selected.

Table 3.2

Numbers of Teachers in the Samples
Numbers of Returns of Surveys
Percentage of Returns

<u>State/ Territory</u>	<u>No. of Teachers</u>				<u>No. of Returns</u>				<u>% Returnee</u>	<u>% Used*</u>
	P.	C.	Pr.	Total	P.	C.	Pr.	Total		
N.S.W.	188	50	12	250	115	23	8	146	58	58
Vic.	168	50	14	232	27	13	1	41	18	18
Qld.	118	24	8	150	67	9	5	81	54	54
S.A.	120	20	10	150	65	14	2	81	54	53
W.A.	122	22	6	150	50	21	8	79	53	51
Tas.	60	10	4	74	45	8	4	57	77	77
A.C.T.	50	20	4	74	31	12	4	47	63	63
NT. (Darwin & Alice Springs)	50	20	6	76	33	16	9	58	76	75
Total:	878	216	64	1156	433	116	41	590	51	50

P. = Public Schools
C. = Catholic Schools
Pr. = Private Schools

* Some surveys were returned by teachers who had left, were on leave or were inappropriate; e.g. from intell. handicapped school. Some were received too late for inclusion.

The States and Territories differed in the method by which the teachers were selected. Table 3.3 contains the methods used.

Table 3.3

Sampling Methods used by the States and Territories

<u>State/Territory</u>	<u>Sampling Method Used</u>
N.S.W.	Stratified random sample of „ne region - North Sydney rrgion.
Vic.	Non-random sample - biased towards schools visited by Road Traffic Authority Consultants.
Qld.	Stratified random sample of the State.
S.A.	Stratified random sample of the State.
W.A.	Stratified random sample of the Stare.
Tas.	Non-random sample - biased towards schools visited by Road Safety Officers.
A.C.T.	Random sample of the Territory.
NT.	Random sample of schools in Alice Springs and Darwin.

3.5 Procedures for Administration of the Project.

The school road safety research project used the following procedures to explore and describe the development and implementation of primary school road safety education across Australia.

3.5.1 Project Method Development.

A review of the literature, both overseas and Australian, on road safety education for children 5-13 years, in the four road user categories specified, was undertaken (Chapter Two). As a result, the project design was decided upon and two surveys developed for data collection. A model was developed against which the major Australian primary school road safety education materials could be assessed for effectiveness (Chapter Four). This model became the basis for the development of guidelines for the developers of primary school education materials and for primary school teachers in their adaptation and implementation of these materials.

3.5.2. Visits to the Capital Cities of the States and Territories.

Contact was made by telephone with the person in charge of primary school education in the road safety authority (or the equivalent) in the capital cities of the States and Territories across Australia. The project was outlined and a date set for the researcher to make a personal visit. The road safety authority contact arranged for the following events to take place during the the researcher's visit:

- * Meetings between the researcher and developers of road safety education materials from:
 - Road safety authority
 - Education Department
 - Police Department (where appropriate).
- * Meetings between the researcher and teachers of road safety education materials;
 - Teachers from public, private and catholic schools
 - Road Safety consultants
 - Road Safety Officers
- * Meetings between the researchers and other researchers
 - Universities in Victoria and Western Australia.

During these meetings the project was outlined; the major school road safety education materials discussed, schools visited and teachers consulted about their road safety programs.

3.5.3. Dissemination of Surveys

Previous research studies have investigated attitudes towards road safety education and its prevalence in schools, either by using postal questionnaires (Russam, 1975; Singh, 1976) or by conducting personal interviews (Firth, 1973; Sadler, 1972) or by using a combination of both methods (Gardner, 1984; Manders and Hall, 1984). It was decided to use a combination of both methods as it *has* been shown that personal involvement is likely to increase the likelihood of survey returns.

a) Survey of Developers

Personal meetings were held with the total population of developers who either reside in the road safety authority or Education Departments of the States and Territories. As a result of this personal communication, it **was** expected that survey returns would be high. This in fact was the result (Table 3.1).

b) Survey of Teachers

The contact person at the road safety authority arranged to have the Surveys distributed to a random selection *of* teachers in their State or Territory. in the two States where this method was not used the data, if **biased**, is biased towards schools visited by road safety officers or consultants.

Table 3.4 presents the institution(s) which took responsibility for selecting the sample of teachers and disseminating the surveys to them.

Table 3.4

Institution which took Responsibility for Selection of Sample of Teachers
and Dissemination of Surveys

<u>State/Territory</u>	<u>Random Selection Arranged</u>	<u>Surveys Disseminated</u>
NSW.	By researchers	By mail by researchers
Vic.	By Road Traffic Authority	By Road Traffic Authority consultants
Qld.	By Qld. Road Safety Council	By mail by Qld. Road Safety Council
S.A.	By Education Department	By mail by Division of Road Safety
W.A.	By Education Department	By mail by National Safety Council of W.A.
Tas.	By Transport Department, Division of Road Safety	By Division of Road Safety Road Safety Officers
A.C.T.	By Road Safety Council of the A.C.T.	By mail by A.C.T. Schools Authority and Catholic Education Office

As can be seen from Table 3.4 co-operation was excellent within and across States and Territories.

3.5.4. Data Analyses

The surveys were analysed using two methods. The closed questions were coded and subjected to computer analysis. The following statistical measures were used:

- ▣ Descriptive statistics
 - frequencies
 - percentages
 - histograms
 - cross tabulations and breakdown

The open-ended survey questions were read and categories drawn up from the frequencies of responses. These frequencies were counted and percentages computed. The major road safety education materials were listed and analysed according to the model for instructional design developed in section 4.3.2.

Chapter Four presents the results of the two surveys together with an analysis of the instructional design of the major road safety materials produced for and used in Australian primary schools.

CHAPTER FOUR: PRIMARY SCHOOL ROAD SAFETY EDUCATION: FINDINGS FROM THE PROJECT

4.1 Survey of Developers - Overview of Findings

Most primary school road safety education materials are being developed, revised or adapted by both the road safety authorities (Federal, State and Territory) and the State or Territory Departments of Education. As the numbers of developers from both groups are not large (31) and visits were made to all capital cities (and Alice Springs) it was possible to discuss road safety education issues with developers as well as request that they complete a developers' survey.

Personal contact with the developers, and the perceived importance of the issues under consideration, led to a 100% return of survey material.

An analysis of the responses to the survey questions by the two groups of developers highlight the similarities and often marked differences between the activities and needs of the two groups.

All developers are involved in developing primary school road safety materials in the four road user categories of pedestrian safety, bicycle safety, restraint usage and alcohol and safety. However, most activity is in the first two categories of pedestrian safety and bicycle safety.

A variety of material is being developed and developers use many approaches in this development, including: analyses of the needs of teachers and Departments of Education; analyses of road safety education research; of materials already in circulation; and analyses of the curricula provided by the Departments of Education. In addition to these analyses, the developers also gather information from a variety of personnel including Departments of Education personnel (eg. curriculum consultants), Police and other relevant people.

The majority of developers do not feel that they have sufficient information about many aspects of road safety education considered, necessary to effectively develop road safety materials. However the needs expressed by developers vary markedly between the two groups. The majority of developers in the road safety authorities consider that they have sufficient information from road safety

research and yet; do not consider that they have enough information about designing instruction for children. The developers in the Departments of Education do not feel that they have sufficient information about road safety research, the road safety materials available, or designing instruction for children.

All developers would like to have information about designing instruction for children. They would also like results from parent and teacher surveys, and reference lists, with critiques, of available materials. They are most concerned about disseminating and implementing their materials and would like to have more information about promotional strategies that could be used. The following sections present in detail the activities and needs of the developers of primary school road safety education materials.

4.1.1 Road User Category Being Developed

Developers from the road safety authorities and the Departments of Education are involved in developing, revising or adapting primary school road safety materials. Materials are being developed in the four road user categories specified, although to varying degrees, as depicted in Table 4.1.

Table 4.1
Percentages of Developers Involved in Developing
Primary School Road Safety Education Materials.

Pedestrian Safety	80.6
Bicycle Safety	87.1
Restraint Usage	51.6
Alcohol and Safety	41.9

Table 4.1 shows that a high percentage (80.6%/87.1%) of developers are involved in developing materials for pedestrian and bicycle safety. Fewer (51.6%) are involved with the area of restraint usage and fewer still (41.9%) concerned with alcohol and safety. The relationship between the four road user categories, as

reflected by the percentage of developers involved, is interesting, and is reflected in the information gathered from the survey of teachers. This observation is referred to in the analysis of the Teachers' Survey (see 4.2).

When the information from developers is divided into two groups (developers within the road safety authorities and developers within the Departments of Education), differences between the two groups become apparent. Table 4.2 presents differences between the percentage of developers from the two groups who are involved in developing materials for the four road user categories.

Table 4.2

Percentages of Developers from the Road Safety Authorities
and the Departments of Education Involved in Developing
Primary School Road Safety Education Materials

Road Safety Area	Percentage of Developers	
	R.S.A.	DE.
Pedestrian Safety	81.3	80.0
Bicycle Safety	87.5	86.7
Restraint Usage	40.0	66.7
Alcohol and Safety	33.3	53.3

R.S.A. = Road Safety Authorities

DE. = Departments of Education

From Table 4.2 it can be seen that more emphasis is placed on the development of restraint usage material, and material for alcohol and safety by the developers in the Departments of Education, whereas similar involvement occurs in both groups for pedestrian and bicycle material development.

The following section presents the types of materials being developed.

4.1.2 Materials Currently Under Development

Across Australia, a smorgasbord of material is currently being developed, revised or adapted. The extent of this development is presented in Table 4.3.

Table 4.3
Primary School Road Safety Education Materials
Currently being Developed, Revised or Adapted by Developers
in the States and Territories across Australia.

State	Materials currently being developed, revised or adapted.
NT. (R.S.A.)	<ul style="list-style-type: none"> * Printed material - posters, leaflets, booklets * Tapes, videos, computer games for years 3-7. * Materials from other states and territories adapted. * Pedestrian safety kit and guidelines for teachers (pre-school to Year 2). * Bicycle safety programs.
Qld. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> * Pre-school Teacher's Guide revised. * Teacher's Guide Years 3, 4 and 5 revised. * 'Ed Safe' - card game using road sign pictures. * Stimulus cards - using photographs to teach traffic education. * 'How to Ride on the Bus' pamphlet for primary school students. * Developing Source books for road safety education to accompany Teacher's Guides.
W.A.(R.S.A.) (D.E.)	<ul style="list-style-type: none"> * Poster set - Natsafe Bike 1-7. * Shoppers guide W.A. details of materials available - updated. * 'Why Child Restraints?' supplements. * Children in Traffic - prescription for walking * Bicycle Safety. In Social Studies Teachers' Guides revised approximately every two years based on comments from teachers, advisory staff and principals. * K-10 Health Education syllabus. * Preparing Syllabus and Teachers' Guide Years 4, 5, 6, 7. * Need for safety when alcohol is present - for Year 7.

State	Materials currently being developed, revised or adapted.
S.A. (D.E.) R-7	<ul style="list-style-type: none"> * Overall Syllabus Outline and Curriculum Guide for teachers - 'Getting There and Back Again'. * Social Studies support packages - 'Transport and Excursions'. * Demonstration portable traffic light set. * Survey guidelines for teachers regarding monitoring/evaluating bicycle facilities funded by State Bicycle Committee. * Revising cyclists' handbook (school age rider). * Continuous reviewing of materials developed by other agencies.
TAS (R.S.A.)	<ul style="list-style-type: none"> * Road Safety Officers adapt road safety materials eg. FORS materials; Bike Ed kit.
ACT (R.S.A.)	<ul style="list-style-type: none"> * Bike Ed A.C.T supplement * Publicity material for School Zones.
NSW (R.S.A.)	<ul style="list-style-type: none"> * Integrated package K-6-12: To include pedestrian, bicyclist, passenger, alcohol and safety. Thematic approaches with emphasis K-2 Child as pedestrian emphasis 3-6 Child as cyclist. To contain handbooks, worksheets, lesson plans, stimulus materials including audio visual supports. * Road safety and Me kit to be revised. * Bike Ed kit to be adapted. * Drink Driving Educational Materials Project to extend backwards to primary school.

From Table 4.3 it can be seen that road safety authority developers are concerned with the development of the following materials in the four road user categories:

- * posters
- * leaflets/booklets
- * kits
- * guidelines
- * games
- * adaption and revision of
 - materials from other states
 - materials already in circulation.

The developers in the Departments of Education are mainly concerned with developing the following:

- * Curriculum syllabus outlines (K-6; R-7; K-10; P-6) in either Health, Social Studies or Road Safety.
- * Road Safety policy (K-6-12).
- * Curriculum support materials to accompany guides, curricula.
- * Bicycle safety
 - Guides revised
 - Bike Ed adapted
 - Bike Ed integrated into primary curriculum.

The approaches used by the developers when commencing to develop materials are discussed in the next section.

4.1.3 Design of Development

Many approaches are used by developers when commencing to develop, revise or adapt road safety materials (see Table 4.4).

Table 4.4or Adapt Materials for School Road Safety Education

State	Methods Used
N.T. (R.S.A.)	<ul style="list-style-type: none"> - Visiting schools and teachers - assessing needs. * Examining existing materials from other states. * Discussion with Department of Education Professional Services Branch Personnel - Curriculum development.
Qld (R.S.A.)	<ul style="list-style-type: none"> * Study curriculum from Department of Education. * Prepare draft of integrated project. * Discuss with curriculum advisers and teachers at selected schools. * Revise, trial, revise, produce material and issue to all schools.
W.A. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> * Personal knowledge from years of involvement. * Research aids available in U.K., N.Z. and U.S.A. * Requirements to supplement Bike Ed programs. * Requirements from instructional staff. * Enquiries from teachers, parents and general public * Wide reading of available literature including statistics. * Contact relevant agencies - Police, National Safety Council, Public Health, Libraries, Schools and Teachers through advisory personnel. * Comparisons with other states.
S.A. (D.E.)	<ul style="list-style-type: none"> * Determine a need by receiving teacher requests, recognising gaps in road safety content, detecting community concern. * Reaction to initiative taken by other agencies. * Recognition of potential value of material developed elsewhere. eg. interstate, federally, overseas. * Look at current material, sort out what is no longer applicable or suitable.

State	Methods Use
VIC (D.E.) (Traffic Schools and DECA)	<ul style="list-style-type: none"> * By interest and extending from there. - Repeated requests from teachers. * Look at what exists and what needs to be developed to fill gaps. Read research. * What would schools be prepared to accept or use.

(R.S.A.) = Road Safety Authority Developers.

(D.E.) = Department of Education Developers.

*ACORSE = The Advisory Committee on Road Safety Education.

(DECA) = Driver Education Centre of Australia, Shepparton.

As can be seen from an analysis of Table 4.4, the methods most frequently used by both groups of developers include the following:

- * Needs analysis
 - What do teachers want?
 - What will teachers accept?
 - Where are there gaps in available materials?
 - What do the Departments of Education want?
- * Materials analysts
 - What exists in other states?
 - What is out of date?
 - Analysis of curricula (Health, Social Science, Road Safety) provided by Departments of Education.
- * Input from personnel
 - Department of Education personnel
 - Police
 - Teachers
 - Relevant others.

As well as the above most commonly used methods, approaches such as the following occur in some areas:

- * Road Safety literature search is conducted.
- * Rationale, aims and objectives are developed.
- * Content is selected and organised.
- * Evaluation techniques are suggested.

It would appear from an analysis of developers responses that the design of material is heavily influenced by selected teachers' needs and attitudes.

Whereas this may be appropriate, it may not be a sufficiently broad base from which to plan. It is obvious from the response to the Developers' Survey that developers are aware of the need for a broader base of information to be available to them. The following section presents an analysis of the information used and needed by developers.

4.1.4 Information Used or Needed when Developing Materials for Primary School Road Safety Education

The majority of developers of materials do not feel that they have sufficient information to effectively develop road safety materials (see Table 4.5).

On further analysis of the responses it becomes very apparent that there are vast differences between the developers in the road safety authorities and the developers in the Departments of Education.

Of the road safety authority developers, 75% considered that they have sufficient information from road safety research; 81% have sufficient statistical summaries of road crashes, 62% have sufficient copies of materials already in school, and 56% have reference lists of available materials (56%). By comparison, the vast majority of the Departments of Education developers (66-100%) do not feel that they have sufficient information from any of the areas listed in Table 4.5.

The needs expressed by both groups of developers, and the differences between their needs should be recognised, and attended to, in the future. Information developers use when developing materials is shown in Table 4.6.

Table 4.5

Percentage of Developers Who Consider that They Have
Sufficient Information from a Variety of Sources.

Information	Developers		
	total Developers	R.S.A. Developers	D.E. Developers
i) Information from road safety research	48.4	5.0	20.0
ii) Statistical summary of road crashes	48.4	51.3	13.3
iii) Copies of materials already in schools	48.4	62.5	33.3
iv) Critiques of materials already in schools	22.6	37.5	6.7
v) Reference list of available material	32.3	36.3	6.7
vi) Information about how children learn	55.5	37.5	33.3
vii) Survey of road safety education needs as expressed by: Teacher Parents	12.6	37.5	6.7
	6.5	12.5	0.0
viii) Information about strategies and procedures which could be used when designing instructional materials so that children's behaviours will be changed.	19.4	31.3	6.7

R.S.A. = Road Safety Authority

D.E. = Departments of Education.

information about designing instruction (25%) and/or surveys of parents (12%) when developing materials. By contrast, a greater percentage of Department of Education developers use information from all areas except for statistical summaries of road crashes.

Table 4.7

Percentage of Developers who would like
Information from the Areas Listed.

Information	Percent; of Developers		
	Total	R.S.A.	D.E.
i) Information from road safety research	45.2	25.0	66.7
ii) Statistical summary of road crashes	29.0	12.5	46.7
iii) Copies of materials already in schools	58.1	43.8	73.3
iv) Critiques of materials already in schools	64.5	50.0	80.0
v) Reference lists of available materials	67.7	50.0	86.7
vi) Information about how children learn	51.6	43.8	60.0
vii) Survey of road safety education as expressed by - Teachers - Parents	64.5	56.3	73.3
	77.4	75.0	80.0
viii) Information about strategies and procedures which could be used when designing instructional materials so that children's behaviours will be changed	80.6	81.3	80.0

(R.S.A.) = Road Safety Authority

(D.E.) = Departments of Education.

When considering the information which developers would like to have it is interesting to note the followings:

- * At least 80% of all developers (R.S.A.) and (D.E.) would like information about designing instructional material.
- * Parent surveys would be useful to 75% (R.S.A.) and 80% (D.E.) of developers.
- * Teachers' surveys, critiques of materials, and reference lists of materials would be useful to 50-56% of developers in the road safety authorities whereas 73-87% of the developers in the Departments of Education would welcome this information.
- * A marked difference is evident between the two groups of developers in their response to the areas:
 - information from road safety research (25% R.S.A./ 67% D.E.)
 - statistical summary of road crashes (12% R.S.A./ 47% D.E.)

Additional information required by developers is contained in Appendix E. An analysis of these needs shows the following to be required:

- * Methods for integrating road safety into the primary school curriculum.
- * Methods for implementing the materials in schools.
- * Promotional strategies.
- * How to apply road safety research.
- * Overseas research/materials made available.
- * Information from section 4.1.4. published in an accessible, simple and concise format for use by developers and teachers.

Although there are similarities, wide differences occur between the two groups of developers in relation to the information they use or need when developing road safety materials. The issues relating to methods of dissemination of materials to schools, parents and communities are also diverse and are presented in the following two sections.

4.1.5 Dissemination of Materials To Schools

The methods used by developers for disseminating materials to schools are many and varied (see Appendix F for Stores and Territory methods). However, an analysis of these methods suggests that the major forms used include the following:

- Direct mailing, sometimes in conjunction with media campaign.
- * Direct mailing of lists of resources available.
- Samples of materials sent to schools - more sent on request.
- * Items requested via order form.
- * Advertised in newsletters, inservice courses, meetings.
- * Regional resource centres/co-ordinations/libraries.
- * Colleges of Advanced Education.
- * Contact with teachers who visit centres.
- * Personal contact with schools.

Developers are most concerned about the effectiveness of this stage of their materials production as evaluations of some materials have highlighted problems in adopting some of the implementation methods. The problems related to 'lack of use' of the Victorian Roadwork Kit (Cardner, 1984) would suggest that direct mailing of materials, en masse without additional promotional and support strategies, may not have been an effective or efficient method to adopt in disseminating the kit. However, it is possible that other reasons associated with the instructional design of the kit may also have been responsible for its apparent lack of use. These will be discussed in section 4.3.

4.1.6 Dissemination of Materials to Parents and Community

Teachers frequently comment on the need for more parent and community support and education in developing road safety skills in children. The developers of road safety materials attempt to offer support by disseminating materials in the following ways:

- * displays, exhibitions, shows
- * media promotions
- * through School Councils, P.&C., P.&F. Associations
- * newsletters to parent; from principals
- * parents/teacher days/nights.
- * worksheets sent home to parents.

Individual State and Territory methods are presented in Appendix G.

Responses made to the teachers' survey suggest that less than 20% of Australian primary school teachers use programs that encourage parental involvement in teaching road safety. Furthermore, of the 20%, the most common types of 'involvement' include the following:

- * newsletters, discussions
- * parents invited on excursions
- * parents informed of or assist in Bike Ed courses
- * parents invited as guest speakers.

Road safety education would appear to be incidental at the teacher/parent level as well as at the teacher/pupil level (see p.76).

4.1.7 Implementation of Materials in Schools

It can be seen from Table 4.10 that developers are a little apprehensive about the widespread implementation of road safety materials in schools. Their concerns may be justified, as the results from the teachers' survey would suggest that **85%** of Australian teachers teach road safety incidentally, and that most teaching occurs in the form of discussion or having a guest speaker visit on a yearly basis.

Across Australia a similar pattern for implementation of materials emerges (Appendix H) and the personnel most likely to implement materials include the following:

- * Teachers (if interested or motivated)!
- * Road Safety Field Officers (mostly once a year).
- * Police (mostly once a year).
- * Consultants (not enough available).

It should be noted at this point that the two most common reasons given by teachers for not using kits, programs or other materials are as follows:

1. Teachers do not know what is available or do not have any in their school.
2. Teachers consider material that is available to be inappropriate ie. outdated or not grade or location suited.

4.1.8 List of Materials Known to be in Use in Schools

Developers were asked to list the materials known to be in use in primary schools across Australia. Table 4.8 contains this information.

Table 4.8

Materials Considered by Developers to be Currently
in use in Australian Primary Schools.

Materials Currently In Use	State				Territories		
	N.T.	Qld	W.A.		CT	NSW	IC
<u>Kits-</u>							
Roadwork				x			
Road Safety and Me						x	
Careful Cobber						x	
The Safe Cycling Course		x					
Bike Ed Kit and							
20 Lesson Plans (state adapted)				x		x	
Ride for Your Life				x			
Packs- Safe Places to Play							
(Pre-school children)				x			
Road Workers				x			
<u>Books-</u>							
Children in Traffic Vols. 1,2,3.				x			
Spikes Bike Books Vols. 1,2,3.				x		x	
Safety Street				x			
Books - Titles not specified			x				

Materials Currently In Use			Stat	a	Te	itories.		
	I.T	Q	W.A	N.S.W	T.A	ACT	NSW	VIC
<u>Booklets, Leaflets, Posters,</u> <u>Wallcharts, Flip Charts-</u> Federal Office of Road Safety Material	x		x			x	x	
State and Territories Road Safety Material	x		x			x	x	
<u>Audio Visual Material -</u> Films, film strips, videos, cassette and slide packs available from audio-visual libraries	x		x			x	x	
<u>Films-</u> I'm No Fool as a Pedestrian			x					
Bicycle Safety			x					
Hector and Millie save Uncle Tom (Aus.)	x		x					x
Hector Goes to Play Ball (Aus.)	x		x					x
This Way That Way Which Way (Aus.)	x		x					x
Riding Your Bicycle (Aus.)	x		x					x
Look After Your Bicycle (Aus.)	x		x					x
Only One Way	x		x					x
Playing the Miles Away (Aus.)	x		x					x
Streets Are For Sharing (Aus.)	x							
Whiplash (U.S.A.)	x							
U.F.O. Unrestrained Flying Objects (U.S.A.)	x							x
Intersection Collisions (U.S.A.)	x							
The Balloon (U.K.)								x

Materials	States and Territories						
	N.T.	Q1	Q2	S.A.	T.A.	ACT/NS	VIC
2. Videos-							
Ride For Your Life						x	
Can You Handle It? (Aus.)	x					x	x
Getting Across (Aus.)						x	x
Bus Safety for Infants						x	
Everything about Bicycles	x						
Playing Safe in Animal Town	x						
Hector's Road Show (Aus.)	x						
Otto the Auto Series							x
3. Slides-							
Rules, Who Needs Them?						x	
Two Wheels, One Life.						x	
Be Safer in Traffic						x	
Road Safety Parts 1,2,3.						x	
<u>Police Department</u> materials	x			x		x	
<u>Department of Education Syllabus/</u>							
<u>Guides.-</u>							
Health Education	x					x	
Social Studies							
Safety (Part of Health Education Curriculum).	x						
Road Safety and Driver Education							
Personal Development							

* The crosses represent materials considered by Developers to be currently in use in primary schools. They are not an indication of what materials are available in each State or the actual use made of them by teachers.

It can be seen from the above table that a variety of materials are considered to be in use in Australian schools. However it would seem from the responses to the Teachers' Survey that less than 40% of teachers use some form of the kit (Bike Ed kit having the most widespread use) and with the exception of posters (83%) and leaflets (70%) and possibly books (51%) there is very little use made of other audio or visual material. What use is made of these materials is frequently only as presented once a year by visiting Police, Consultants or on yearly class visits to Road Safety Centres.

4.1.9 General Comments and Summary

The following general comments were made by the developers either directly to the researcher or in the 'general comment' section of the Developers' Survey:

- * There is a need for a central co-ordinating agency from which information can be sought, in order to avoid duplication of resources and wastage of time and energy. Informed decisions can then be made.
- * There is a lack of liaison between the Federal Office of Road Safety and the State and Territory road safety authorities. For example:
 - (i) posters arrive in schools unsolicited, unexpected and unwanted by the authorities;
 - (ii) pamphlets, etc. are withdrawn without notice when in fact States find them useful;
 - (iii) pamphlets produced e.g. Alcohol and Road Usage which are of little use in W.A. where the police image is being developed in a positive, community spirited way.
- * There is a lack of formal co-ordination between road safety authorities and other 'teaching' departments, e.g. Police Department and Department of Education (except in two States where a committee exists with representatives from these and other areas).
- * There is perceived to be an uneven availability of funds.
- * Large amounts of money are spent on media based promotional campaigns which tend to use market research strategies rather than educational/behavioural change strategies.

- * There is a lack of personnel in some offices,
- * Lack of time to develop suitable materials.
- Lack of expertise to develop suitable materials.
- * Lack of knowledge about designing instruction even when 'experts' are on the staff - or are seconded from the Departments of Education (secondments usually lasting one or two years).
- * Lack of analysed research literature.
- * Materials currently available are not sufficiently sequenced in age/stage/behaviours nor do they have clearly defined objectives which separate the road safety knowledge from the road safety behaviours to be developed.
- The film and video area is abysmal with few exceptions.
- * There is confusion as to what teachers want - kits, loose leaf sheets, videos, lesson plans, guides, sequential materials graded from the first year of school onwards, integrated units incorporating road safety in language, maths, social studies, or none of it!
- * There is a lack of priority placed on road safety education by the Education Departments. Road safety is a small section of the Health and/or Social Studies curricula of most education systems.
- * The lack of road safety education in schools is only partially explained by a lack of suitable materials. Provision of materials would be ineffective unless teachers and parents are convinced of the need for road safety education.
- * There are problems in knowing how best to 'sell' (disseminate) materials to schools, parents and community.
- Promotion of road safety in schools needs exploring. Many teachers are not aware of available resources.
- * Related problems of the autonomy of schools - Principals and/or School Councils must be convinced of the need for road safety to be included in school policies and curricula.

Summary

Developers of road safety materials are concerned by the lack of organised support and information which is currently available to them. They would welcome an accessible, simple and concise document, or series of documents, which would contain the following: information from road safety research; summaries of crash statistics (State and National); an annotated bibliography of available materials with critiques; information about how children learn; and information about how to design materials to effectively teach road safety knowledge and behaviours. Developers want to be involved in the process of developing such a document or series of documents and are conscious of the need to have a core national document with State and Territory 'overlays' to show inter and intra State and Territory differences. Some sections of the document would need to be updated yearly, other sections as the needs arose.

In addition to gathering and analysing information from the developers of primary school road safety education materials, information about the teaching of road safety in primary schools was also collected. A Teachers' Survey was used for this purpose and the information from the surveys analysed. The results are presented in the following section.

4.2 Survey of Teachers - Overview of Findings

Primary school teachers across Australia are expected to impart knowledge and develop skills in a number of (what seems to teachers to be), ever expanding areas. There are not only many Curriculum Policy Statements and related 'Perspectives' on these Statements but, in addition, Departmental Policy Statements, which each school is expected to recognise, and, where specified, to develop school-based curricula, to teach and to evaluate.

Minimal support is given for any of these tasks, and it is quite understandable that a common cry expressed by teachers replying to the survey was:

We don't have time!

This fact, coupled with, or perhaps caused by, the relatively low priority given to road safety education by the Departments of Education, has resulted in teachers placing a low priority on this area as the following statements from teachers indicate:

- * Road safety consisted of four lessons in a year's Health Program.
- * Nature of our ever expanding curriculum has precluded road safety.
- * Road safety is one small section of Safety, which is one small section of Health.

Less than 14% of teachers claimed to have some form of school-based curriculum for road safety. Furthermore, it is doubtful if these curricula contain sequenced activities to develop knowledge and skills right across the primary years.

In spite of the problems of priority and time, most teachers did endeavour to teach road safety to some degree. The vast majority of teachers achieved this either by treating road safety incidentally as specific needs or problems arise, or by treating it as a small part of a broader Health or Social Science program.

Class or group discussions, and yearly visits by guest speakers, were the most common form of teaching across the four road user categories, although only a small percentage of teachers discussed restraint usage, and an even smaller percentage discussed alcohol and safety. In fact, quite a few teachers considered that teaching about alcohol and safety was neither relevant nor appropriate in the primary years.

Less than half the teachers surveyed claimed to use a kit or program in their road safety teaching. The programs most frequently used were two Victorian kits, Roadwork and Bike Ed, or adaptations of these kits. However their use is very meagre (5% used Roadwork, 7% used Bike Ed) although they are being used in three or more States. Other materials most often used by teachers included posters (used by 83%) and leaflets (used by 70%) developed by the Federal Office of Road Safety and the State and Territory road safety authorities.

Most teachers who did not use kits or programs claimed that they did not know what was available or stated that there were none available in their school. A smaller percentage considered that the available material was not appropriate in

that it was outdated or not suitable for their grade. Similar comments were made by those teachers who did not use other types of materials.

It was considered by teachers that parents should play a major role in developing road safety knowledge and skills in children. Yet less than **20%** of teachers encouraged parental involvement in this area. Furthermore, where it was encouraged it was in the form of booklets and notes sent home to parents or parents being invited on excursions. In a few schools Bike Ed activities involved parents and it would seem that use of this kit is extending.

Slightly more than **50%** of teachers considered that they had sufficient support in order to teach road safety. This was not surprising since the majority of teachers teach road safety incidentally and use posters and leaflets for this purpose. These types of materials are being produced and disseminated, often directly, to schools.

Additional support that would be welcomed by teachers included kits, programs and **guides** which should contain videos, posters, films, activities and stickers. This material should be Australian, cheap, readily available, easy to follow, suitable for urban and rural environments, interesting, realistic and suitably analysed for Pre Year 1 to Year **6** or **7**.

In addition, an annotated bibliography, with critiques, of national, State and Territory materials would assist selection of materials. As far as support personnel was concerned, teachers would welcome expert consultants from any department.

The following section gives details of the Survey of Teachers.

4.2.1 Organisation for Teaching Road Safety

The teaching of primary ~~school~~ road safety education is not a high priority with any State or Territory Department of Education. As a result, the vast majority of primary school teachers (**85%**) teach aspects of road safety on an incidental basis, as specific needs or problems arise. The following table shows the four most common methods which teachers use to organise road safety for their classes.

Table 4.9

Organisation of Road Safety Teaching Showing Percentage of
Total Sample of Teachers who Use Each Type.
In Addition, a Breakdown by Year is Included.

Organisation	Percentage of Teachers								
	All teachers	Pre Year 1	1	2	3	4	5	6	7
1. Incidentally as specific needs arise	85	81	90	84	93	86	82	84	90
2. As part of a broader health & safety education program	60	77	56	59	62	58	54	49	55
3. A "one off" lesson/visit/talk by a guest speaker	46	37	40	45	53	51	54	43	45
4. As an integrated "theme" within another curriculum area	35	46	47	48	35	31	32	13	21

From Table 4.9 it can be seen that there were marked similarities and some differences between teachers in the various primary grades in their organisation for teaching road safety. The majority of teachers across all grades taught aspects of road safety incidentally as the needs arose. More pre Year 1 teachers taught road safety as part of a broader health and safety education program. The likelihood of a "one off" visit by a guest speaker was highest in the middle primary years (Years 3-5) and an integrated approach was most often used in the early primary years (pre Year 1 to Year 2).

Many methods were used by teachers in order to teach aspects of road safety to primary school children. The major methods used by teachers include those presented in Table 4.10.

Table 4.10

Major Teaching Methods for Road Safety Education
Used by Primary School Teachers

Methods Used	Percentage of Teachers Choosing Each Method for Teaching the Road Safety Areas			
	Pedestrian Safety	Bicycle Safety	Restraint Usage	Alcohol and Safety
1. Class/group discussion using pamphlets/posters	75	74	28	28
2. Guest road safety speaker	67	67	30	12
3. *Visits to real traffic situations	55			
*Simulated traffic situation		35		
*Slogans			15	
*Themes in other curricular areas				7

As can be seen from Table 4.10, most teachers used either class/group discussions, or guest road safety speakers, when teaching about aspects of road safety. It is also obvious that most teaching occurred in the areas of pedestrian safety and bicycle safety. Less than 30% of teachers discussed restraint usage or alcohol and safety. These percentages may reflect the availability of suitable materials.

By taking each of the major methods used to teach road safety, and breaking down the information into Year levels, differences in teaching between the year levels were identified. The following three Tables, 4.11, 4.12 and 4.13 present this information.

Table 4.11

The Percentage of Teachers for Each Grade who Used
Class/Group Discussion to Teach the Four Road User Categories

Road User Area	Percentage of Teachers							
	Pre Year 1	1	2	3	4	5	6	7
Pedestrian Safety	88	89	78	82	73	62	57	59
Bicycle Safety	60	83	81	82	79	66	84	59
Restraint Usage	29	24	37	30	24	19	22	24
Alcohol and Safety	29	24	37	30	24	19	22	24

It would appear that more teachers in the lower primary years (pre Year 1 to Year 3) discussed restraint usage, and alcohol and safety. In summary, it would appear that more teachers in the lower primary years used class/group discussions to teach road safety than in the middle/upper years.

The second major teaching method used by teachers is the use of guest speakers to teach aspects of road safety. Table 4.12 shows the percentage of teachers who used this method.

Table 4.12

The Percentage of Teachers for Each Grade who Use
Guest Road Safety Speakers

Road User Area	Percentage of Teachers							
	Pre year 1	1	2	3	4	5	6	7
Pedestrian Safety	78	72	76	70	64	62	51	45
Bicycle Safety	49	55	71	69	74	80	70	62
Restraint Usage	28	21	41	30	24	24	31	31
Alcohol and Safety	4	0	12	9	12	14	19	27

From Table 4.12 it can be seen that guest road safety speakers were used differently across years and across Road Safety Areas. It appears that for pre Year 1 to Year 3 more teachers used guest speakers to teach aspects of pedestrian safety than in other years. Year 2 to Year 6 teachers (with the majority of teachers of Years 4 and 5) had guest speakers for Bicycle Safety. Restraint Usage speakers were organised by more teachers in Year 2 whereas Alcohol and Safety was presented by guest speakers in the late primary years, although the percentage for this area is very low.

The third most likely method to be used by teachers is different for each of the road user areas. Table 4.10 and 4.13 present these differences.

Table 4.13

The Percentage of Teachers for Each Grade who Visit Real Traffic Situations for Pedestrian Safety; Simulated Situations for Bicycle Safety; Teach Slogans for Restraint Usage and Teach Alcohol and Safety by using Themes in Other Areas.

Method	Percentage of Teachers							
	Pre Year 1	1	2	3	4	5	6	7
Pedestrian Safety - Real Traffic	71	73	62	57	38	46	43	41
Bicycle Safety - Simulated	20	41	33	28	27	31	43	24
Restraint Usage - Slogans	17	17	22	12	7	14	12	10
Alcohol and Safety - Themes in other areas	1	1	9	5	12	9	1	10

From Table 4.13 it can be seen that more teachers in the lower primary school years, pre Year 1 to Years 2 and 3, took children to the 'real' situation to teach about Pedestrian Safety. Approximately 40% of teachers in all other grades claimed to take their children to 'real' situations. However, comments made by teachers would suggest that these occasions were not frequent and were usually the result of an 'excursion' for purposes other than road safety education.

The third major method used for reaching Bicycle Safety was use of a simulated traffic situation. More teachers from Year 1 and Year 6 used this method to teach Bicycle Safety.

Slogans were used by lower primary school teachers (pre Year 1, Years 1 and 2) to teach Restraint Usage. However, the percentages were not high. Alcohol and Safety was taught by means of themes in other curriculum areas by a very small percentage of teachers in the lower primary years. This percentage rose in the later primary years, although percentages still low.

Various support materials and people were used by teachers in their teaching of road safety. The following section presents these supports.

4.2.2 Support Materials and Support People Used

The materials which developers perceive teachers as using in the schools are similar to the materials which teachers indicated they used (cf. Tables 4.8 and 4.14). However the magnitude of use of some materials would not be considered sufficient to ensure adequate road safety education of primary school children. Few teachers reported using films or videos and less than 40% used programs or kits. By comparison, 70% - 83% of teachers reported using posters and leaflets in their (mostly) incidental teaching of road safety. The following Table (4.14), and related discussion, presents information about the support material and people used.

Table 4.14

Kit or Program used by Teachers

Kit or Program	Teachers using materials			State ² of origin	State or Territory using materials
	Number	Total sample	%Users ¹		
Roadwork	4	9	23	N/A	VIC, SA, ACT
Bike Ed	3	9	23	N/A	VIC, ACT, TAS, WA
Hector Cat ^a	6	4	11		VIC, ACT, SA, WA, NT, QLD
Road Safety & Me	2	4	9	15	NSW
Childrens' Highway Code ^a	2	4	9		VIC, ACT, SA, NSW, QLD
Departments of Education material: - Health - Safety - Social Science	6	3			NT, QLD, WA, SA, ACT
Police Program	5	3	6		NT, QLD, WA, SA, NSW
Traffic School	3	2	6		NT, WA, SA, VIC
The Safe Cycling Course	2	2	5	15	QLD
DECA*	1	2	5	N/A	VIC
Careful Cobber Ride For Your Life	3	1	4	10	SA

DECA* = Driver Education Centre of Australia, Shepparton, Vic.

^a Hector Cat and Children's Highway code distributed across Australia by FORS

N/A Victorian survey returns too few to be representative

¹Users = 40% of total sample

²State of Origin = state where kit or program developed

It can be seen from Table 4.14 that although teachers used kits or programs, the percentage of the total number of teachers in the sample who used any one kit was extremely low. The kits produced by the individual States are used within those States with the exception of the two Victorian kits, Roadwork and Bike Ed. These two kits have been adopted by other States and Territories. The major kits used will be discussed in detail in section 4.3.

Teachers who did not use a kit or program gave the following reasons for not doing so:

1. Did not know what was available or did not have any in their school.
n=159
2. Considered material available to be inappropriate, i.e. outdated or not suitable for their grade.
n=49
3. Taught road safety incidentally.
n= 25
4. Used their own approach.
n= 22
5. Had not enough time.
n= 15
6. Hadn't looked/not necessary.
n= 13

A very different picture emerged when other road safety materials were considered. The other materials most often used by teachers included:

Posters **83%**

Leaflets 70%

However, few titles were listed by the teachers. Those most frequently listed included the following:

Posters - Molly Meldrum n=24

Films - Hector Series n=17

(frequent comments suggest the series is unsatisfactory)

Pamphlets- Cycle Safety	n= 8
- Road Signs	n= 7
Books - Spike's Bike Books	n=17

Reasons given by teachers for not using other materials mirrored those given by teachers for not using a kit or program and included the following:

- * Didn't know what was available.
- * Lack of suitable materials.
- * Not readily available.
- * Lack of time.
- * Not a priority.

'Outside people' were used to give road safety education by 77% of teachers. Of those 77%, most used the Police (57%) to visit once a year. Road Safety Consultants were used by 20% of teachers, again on a yearly basis. Other teachers, Department of Education Consultants and parents were rarely used.

It would seem that more teachers used posters and pamphlets in their teaching about road safety than any other form of material support. This does not seem surprising since posters and pamphlets are more readily available. However, teachers have suggested that if other materials were readily available then they would use them (see section 4.2.5). For support from people, the majority of teachers used Police and would continue to do so in the future, although they would like more contact with expert consultants (see section 4.2.5.).

All Departments of Education in Australia produce some form of syllabus or Curriculum Guidelines and Support Statements to help teachers select material and develop school and class programs of work. The following section considers the position of road safety education in this development.

4.2.3 Curriculum for Road Safety Education ¹

It is not the purpose of this report to give a detailed discussion about curriculum change and development. However it is useful to include some background information on recent changes which have taken place in Australia.

Educational changes in Australia during the 1970's saw schools offered an increased responsibility for curriculum decision-making (Beeson and Gunstone, 1975; Skilbeck, 1976; Connell, 1977; Kemp, 1979). Many terms have been used to describe this phenomena such as 'devolution of responsibility' (Karmel, 1973), 'devolution of decision-making' (Schools Commission, 1978), 'curriculum autonomy' (Beeson and Gunstone, 1975), and 'school-based curriculum development' (Skilbeck, 1976).

The release of the Karmel Report (1973) made public the 'devolution of responsibility' issue. The report advocated a 'grass roots approach' (Karmel, 1973:10) in which school personnel, children and parents would be expected to be involved in curriculum decision-making. Some advantages and disadvantages of school-based curriculum development have been listed by Carlin, Purchall and Robinson (Kemp, 1979:4-5) and are presented in Appendix 1.

If teachers are to play an important role in school-based curriculum development then they need access to the following (Kemp, 1979:8):

- * Information about existing curricula and materials.
- * Results of research and survey work.
- * Copies of reviews.
- * Summaries and analyses of relevant psychological and philosophical positions.
- * Skills of observation and evaluation of pupil reaction.
- * Skills of self analysis and reporting.
- * Increased inter and intra support/in-service/conferences conducted by consultants and advisors.

Schools have accepted the freedom to develop school-based curricula to varying degrees, and so it was of interest to the researchers in this road safety research project to ascertain whether or not schools had sufficient support, and whether or not they had chosen to develop their own curricula for road safety. It was known that road safety was not developed as a separate curriculum area by any of the Departments of Education, except in South Australia. In South Australia, the Road Safety and Driver Education Syllabus Outline and Curriculum Guide R-12 (Education Department of South Australia, 1979) is a comprehensive book which is intended to be used by teachers in developing an integrated approach. To this end, topics and units are included with suggestions for activities which could be integrated with other curriculum areas.

Road Safety does occur in curriculum guides in all other States and Territories in Australia as part of Safety and/or Health/Social Science/Personal Development areas. However, road safety is one very small part of these areas, which may help to account for the fact that over **86%** of the teachers surveyed did not have a school-based curriculum for road safety. Although many teachers recognised the necessity for road safety education, the reasons given for not developing a curriculum included the following:

* Road safety was not a priority area.	n= 136
* Lack of time.	n= 108
* Part of Health/Social Science/Integrated.	n= 61
* Lack of interest/awareness/need.	n= 45
* Individual teacher's concern.	n= 36
* Used Police program.	n= 8
* Not entirely a school responsibility.	n= 8
* Already overcrowded curriculum.	n= 8

The teachers who did have a school-based curriculum for road safety (13.6%) used the following resources when developing their curricula:

* Police program	n= 40
* Kits	n= 10
* Films	n= 13
* Posters	n= 10
* Consultants	n= 10
* Roadwork	n= 9
* Bike Ed	n= 8

There was no mention of parents or children being involved in decision-making during development of the curricula. This was not surprising as parent involvement in road safety education was encouraged by less than 20% of the teachers surveyed (see following section).

Two school-based curricula for road safety were sent to the researcher by interested teachers from South Australia. One document integrated road safety into the broader area of safety and contained goals, aims, objectives, content, activities, background notes for teachers and a list of resources. The second document was a road safety curriculum policy containing general aims,

methodology, curriculum content, the role of the key personnel, parents and community involvement, evaluation. R-7 overview of objectives, integration ideas and resources. Each section stated the school policy and referred teachers to the relevant section of the Road Safety and Driver Education Syllabus Outline (Education Department, South Australia, 1979).

Both documents contain ideas for teachers to develop into lessons for their class. However, in neither document is specific content analysed according to the information to be learned. As a result, procedures are not specified, objectives not sequenced and media not selected to match objectives. Evaluation, although suggested, was not specifically related to the procedures in the instruction.

Whilst it is often considered unnecessary or even unwise to develop structured material for teachers, it would seem from teachers' comments that there is a need for well designed instructional materials to be available, so that they can adapt or modify the material easily and quickly and present it to their class.

Much more support in the form of well designed materials, and in-service personnel, will be crucial if more schools are to face the task of developing a school policy and curriculum for road safety.

4.2.4 Parent Involvement in Road Safety Education

Of the 19.6% of teachers who claimed to encourage parental involvement in teaching road safety, the involvement took the following major forms:

- | | |
|---|------|
| 1. Information (booklets, awareness, letters) sent home to parents. | n=25 |
| 2. Parents (who could come) invited on excursions | n=21 |
| 3. Parents (who could come) assist in Bike Ed/ Safe Cycling Course. | n=18 |
| 4. School encourages parental involvement in most areas. | n=16 |
| 5. Some parents invited as guest speakers. | n=13 |
| 6. Parents help at home with projects. | n=11 |

Involvement did not take the form of active involvement in decision-making as suggested by Karmel (1973). Rather, there is a definite lack of involvement of parents with 4% or less involved in any of the areas stated above.

4.2.5 Future Road Safety Education Needs of Teachers

Slightly more than 50% of teachers considered that they had sufficient support to teach road safety. It is interesting to consider the individual percentages from the States and Territories.

Table 4.15

Percentage of Teachers in Each State or Territory who Considered that they have Sufficient Support to Teach Road Safety.

State or Territory*	Percentage of Teachers
N.T.	58
QLD.	48
W.A.	38
S.A.	64
TAS.	59
A.C.T.	62
NS.W.	48

*Victoria is excluded from the Table as the number of surveys returned was not sufficiently high to be considered representative.

From Table 4.15 it can be seen that there are considerable differences between the states and territories in the teachers' perceptions of the support they have for their own teaching of road safety.

Additional support requested by teachers is of two types, materials and people support.

(i) SUPPORT MATERIALS

Teachers have suggested that future road safety education materials should be Australian, modern, inexpensive, readily available, easy to follow, urban and rural in coverage, interesting, realistic and suitably analysed for pre Year 1 to Year 6 or 7, i.e. for the primary years of schooling. In addition, many teachers would like an annotated bibliography of road safety materials with critiques to help them locate national and State materials (cf. National Heart Foundation Heart/Health Book File and the Australian Dairy Corporation material)

Specific materials requested included the following:

Kits, programs, guides, plans containing:

- * videos
- * posters
- * films
- * songs, games, activities, stickers etc.

The general statement about support materials made at the beginning of this section, would need to be considered before such kits would be acceptable to teachers.

The three most favoured future materials would be used by the following percentages of teachers.

Materials	Percentage of Teachers who would use materials Road User Categories			
	Pedestrian Safety	Bicycle Safety	Restraint Usage	Alcohol & Safety
Videos	79	77	57	35
Posters	78	75	54	31
Kits	73	70	46	29

The percentages displayed in Table 4.16 reflect the current trend in road safety education of developing the pedestrian and bicycle areas. Promotional strategies will need to be considered if teachers are to effectively develop knowledge and skills in the latter two road user categories. The issue of Alcohol and Safety as a primary school road user topic will need special consideration, as even on an incidental level, its occurrence was meagre. In fact, as stated previously, many teachers believed the teaching of alcohol and safety is inappropriate at the primary level.

(ii) SUPPORT PEOPLE

Teachers have suggested that future 'People Support' should come from 'experts' in the field - whoever they may be. The following support people (Table 4.17), if supplied in the future, would be used by teachers.

Table 4.17

Percentages of Teachers who would Use Support People in the Four Road User Categories if Supplied to them in the Future.

Support People	Percentage of Teachers who would use Support People			
	Road User Categories			
	Pedestrian Support	Bicycle Safety	Restraint Usage	Alcohol & Safety
Police	81	80	58	38
Road Safety Consultants/ Field Officers	75	75	54	34
Department of Education Consultants	38	38	30	21
Parent Support	34	34	26	16

It can be seen from Table 4.17 that the people considered 'experts' by teachers included both Police and Road Safety Consultants/Field Officers. A high percentage of teachers would select from these two sources for support for Pedestrian Safety and Bicycle Safety education. However, teachers did put qualifications on their use of Police Officers. Many comments suggested that Police were not always suitable, and would only be used if they were 'good teachers' and if they used audio/visual support material. Some teachers suggested that to be most effective, pre, during and post lesson materials should be available.

The most frequent general comments made by teachers included the following:

- * Parent education/support needs developing.
- * Nature of the ever-expanding policy statements issued by the Departments of Education is swamping teachers.
- * Need for Federal support and PROMOTION in developing materials and yet materials should be State specific.
- * Suggestions for inclusion in programs.
 - updating materials (especially ancient films)
 - more stock hat ads featuring eg. Dean Woods/Gary Sutton
 - T.V. clips aimed at primary school children (not Hector Cat!)
 - stickers (like those used for water safety)
 - task analysed programs presented systematically throughout the primary years. Road safety should be compulsory at each level.
 - Road Safety should include more than bicycle education in the primary grades.

Other comments which are worthy of note include the following:

- * Rural schools need a different approach - kits and videos of both urban and rural situations - perhaps mobile van?
- * More short term projects with 'licences' at successful completion of stages.
- * Emphasis should be placed on developing positive behaviours - not just knowledge.

4.3 Instructional Design of Major Primary School Road Safety Education Materials Produced in Australia

4.3.1 Overview

Less than 40% of teachers surveyed claimed to use a kit or program when teaching road safety. The kits or programs these teachers used are presented in Table 4.14. It can be seen from this table that no one kit was used across Australia and that the level of use of any kit was low even if percentage of use, in the State where the material was developed, is considered.

There have been evaluative studies of aspects of some kits or programs, and these will be discussed as the kits are discussed (section 4.3.3 to 4.3.10). However, to date there has been no detailed evaluation of the instructional design of the materials. To this end, the instructional design of the kits most used by teachers is to be considered in relation to the model for instructional design presented in the following section.

The most used kits or programs include the following:

- * Roadwork (Vic)
- * Bike Ed (Vic)
- * Hector Cat (FORS¹)
- * Road Safety and Me (NSW)
- * Children's Highway code (FORS)
- * The Safe Cycling Course (Qld)
- * Careful Cobber (DECA²)
- * Ride For Your Life (SA)

¹FORS Federal Office of Road Safety

²DECA Driver Education Centre of Australia, Shepparton, Victoria

The assumption is frequently held by people from inside and outside the teaching profession, that teachers must have professional freedom to develop programs of work suitable for the children they teach and that the ideal support given to teachers should be broad guidelines which include 'support suggestions'. Any structure which might be imposed on the teacher's freedom runs counter to their right to have that freedom.

Developers of guidelines, kits and materials are therefore very concerned to ensure that their materials are seen as 'suggested guides' from which teachers might structure useful lessons, units and programs of work. The frequent result is that teachers subsequently ask for support in dealing with areas such as sequencing, grading, forming lessons, units and programs of work. Developers then respond to this need by attempting to further structure the content of the course into materials so that teachers can use it effectively (Personal communication, 1985).

A misconception frequently held is that by structuring content, flexibility for the teacher is removed. Contrary to this belief, is the fact that by analysing the content to be taught, the logical relationship between all sections of a course becomes clearly apparent and therefore easier to implement.

Teachers, once presented with material which has been logically analysed, are in a better position to see the educational significance of the suggested sequences for instruction when they come to develop knowledge and skills in their children.

4.3.2 A Process Model For The Design Of Instruction

Several models for road safety education have been developed (OECD Report on Pedestrian Safety, 1978; van der Molen, 1975; Rochengatter, J. 1981). All have attempted to present a broad conceptual framework for traffic education, with the later models becoming more detailed in an attempt to accommodate the factors which have been identified from the traffic training experiments as contributing to the effectiveness and efficiency of training. However, none of the models have been developed as a result of an examination of the principles of instructional design or as a result of an examination of models of instructional design.

Traditionally, the design or planning of instruction has been considered an art. Subject matter experts, that is, authorities in particular content areas, followed their own creative impulses to design courses of instruction. The selection and organisation of course content tended to be governed by the designer's interest, and perhaps more significantly, by the amount of time allotted to particular courses of study. Decisions about the delivery of instruction followed the inclination and experience of the designer.

During the last ten years or so, significant changes have occurred in the nature of instruction and instructional design. Training has become more scientific, because it is increasingly based on systematic approaches, which are in turn based on evidence of effectiveness, validity and efficiency of the training.

The term 'instructional design' has been used by Maggs et al. (1984: 2) to mean

A system for designing, implementing and evaluating the total process of training and learning in terms of content analysis, the identification of objectives, sequences and appropriate media and the evaluation of these efforts ... it is based on research on human learning and communication, and has been shown to be effective and productive.

The model proposed in this report for designing effective road safety instruction derives not only from the selection of elements taken from the best existing models of instructional design (Andrew and Goodson, 1980) but also from analyses of research on human learning and communication (Engelmann and Carnine, 1982; Maggs et al, 1984). By considering the interdependence of learning, behaviour, stimuli and knowledge systems, an instructional design model has been constructed which has the following principles underlying the instructional design process:

- * Behaviour is learnt as a function of ENVIRONMENTAL EVENTS.
- * Learning is a function not only of WHAT IS PRESENTED to the learner but HOW IT IS PRESENTED.
- * Certain SKILLS MUST BE MASTERED before more complex learning can take place.

The model is best presented as a set of eight steps, or stages in design. All stages in the design of instruction are interrelated and decisions relating to any one stage must be made in conjunction with decisions made about other stages. For example, decisions about what media to choose are made as a result of what objectives are considered appropriate. More specifically, if the child is to learn to 'turn right on a bicycle at an intersection on the road' and the objective is that the child 'demonstrate' the skill, then the medium of a poster followed by discussion is not sufficient. In this example, the media chosen to assist reaching the objective must include 'demonstration of the skill at an intersection on the road' followed by practice by the child of the necessary procedures.

The dynamic process model is illustrated in Figure 2.1.

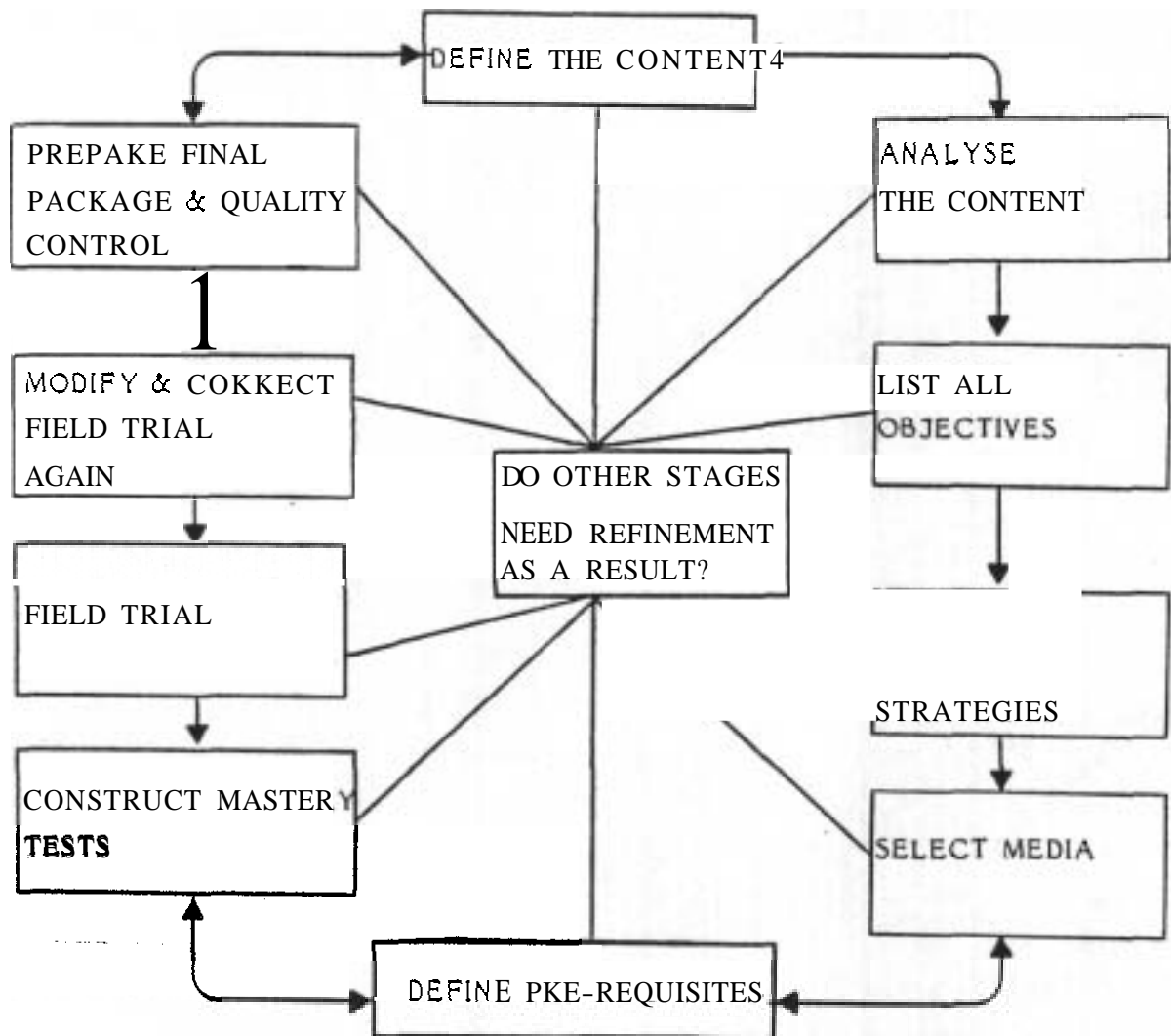


Figure 2.1 Model For Designing Instruction

The eight stages in the design of instruction include the following:

Defining the Content

The designer's first task is to define the content to be included in the course or program. This can be done through a variety of analyses which can include the following:

- * AN ANALYSIS OF ROAD SAFETY NEEDS - which can be compiled from areas mentioned previously such as child road crash statistics (Elliott, 1985):
 - who is having the crash: age, sex?
 - when do the crashes occur?

- what factors emerge?
- where and how do children play? exposure data. (van der Molen, 1981;)
- What child characteristics might influence the likelihood of a crash?

At present the Federal Office of Road Safety is undertaking the task of standardising data gathering on child road crashes throughout Australia. By doing so it is expected that a more substantial data base will be provided from which decisions about child road safety education can be made.

Child 'road safety needs', however, is a broader area than child 'road crash statistics' and should also include the study of children's behaviour on roads (including risk data), results of surveys into areas such as alcohol use and surveys relating to areas of child road safety education.

- * AN ANALYSIS OF ROAD SAFETY TASKS. Many researchers have developed analyses of the pedestrian tasks (Snyder & Knoblauch, 1971; Avery, 1974; Singh, 1983; OECD, 1983; Vinje, 1981). Many of these analyses are based on evidence from investigations, others are based on the flimsiest supporting evidence (Grayson, 1981: 171). However it is true to say that analyses of pedestrian tasks are more detailed than for the other three road user categories under consideration in the present study.
- * AN ANALYSIS OF RESEARCH RESULTS from both the child road safety and the instructional design field, as well as consultation with 'experts' in both fields. The information presented in Chapter Two would be useful at this point. This information when combined with an understanding of instructional design technology would help define the content area for instruction.
- * AN ANALYSIS OF PREVIOUS TRAINING EXPERIENCES.
 - What have the children been taught in the four road user categories?
 - Was the training successful - were knowledge and behaviours developed?

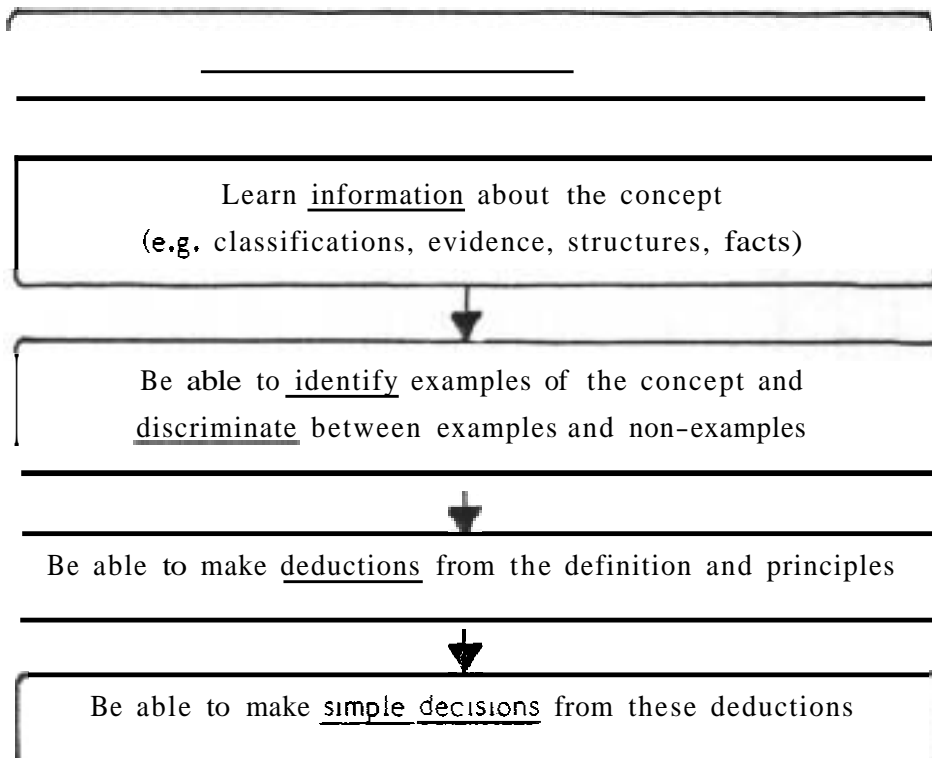
As a result of some or all of the ~~above~~ analyses, content is able ~~to~~ be defined and a general (global) objective formulated. More specific objectives are not defined at this point, as the content must firstly be analysed and categorised. For example, if the global objective is 'to teach operational skills for bicycle riding' then the designer will make decisions about what content is to be included, for example, 'moving off' skills but not 'changing tyre' skills.

Analysing The Content

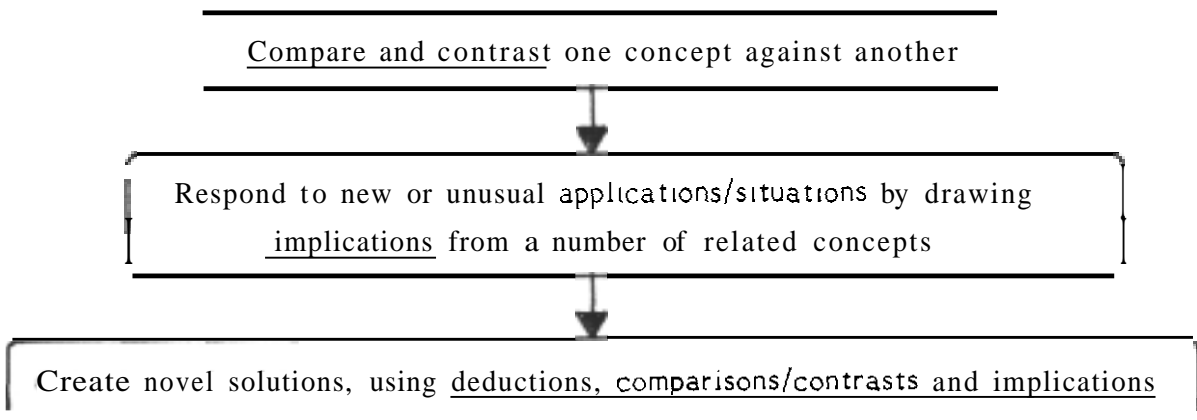
Programs for developing road safety knowledge, skills ~~and~~ attitudes in primary school children are usually concerned with the teaching of concepts and procedures. The program developer must therefore be capable of analysing any concept or procedure in such a way that, after instruction, the learner will be able to apply concepts, to perform procedures competently, and to solve problems.

Teaching a concept involves much more than presenting information and asking questions. If a learner is to apply the knowledge, then procedures need to be included which will enable the learner to use the concept, in order to make decisions and to solve problems.

In order to learn ~~one~~ concept, the learner must:



Once students have acquired several related concepts in this 'Yay, they can then learn more sophisticated problem solving techniques by learning to:



(Maggs, O'Brien and McMillan, in press)

Not all courses wish to develop such high level cognitive skills. However, if a course does expect these problem-solving skills to result, then these aspects must be built in as the program or course is being developed.

Each concept should be analysed according to the above steps. These steps can be charted using flow chart methods which can become the plan for each section of the program or in fact for computer assisted instruction frames.

Many major concept areas in road safety education have procedures or tasks associated with them. Children often learn concepts in order to perform a particular task. Procedures need to be slotted into the sequence of minor concepts after the learner has acquired concepts vital to the performance of the procedure. If decision points and consequences of particular actions are incorporated in the training, the learner not only learns how to perform a task but why it is performed that way and what will happen if it is not performed to the standards specified in the instruction.

When children are expected to make decisions, there are usually concepts which must be known in order to make those decisions. Procedures need to be analysed for necessary concepts so that they can be incorporated into the training. Concepts distilled from procedures should be compared with the list of minor concepts already drawn up and any missed can then be added.

Previews of the instruction should be incorporated before each major concept area is developed. The preview should state what is to be covered, that is, the

minor concepts, usually in point form, and should provide a framework for learning to occur. Summaries should be included in lessons, units and programs in order to consolidate what has been learnt.

To create a full instructional chart or map for a program, the developer would need to do the following for each major concept area:

- analyse each concept
- * chart procedures
- * include comparisons and contrasts
- * develop problem-solving sequences
- include previews and summaries.

The more thorough the analysis, the easier it will be to define objectives and prepare materials.

Setting Objectives

Once the instructional map has been designed, the definition of objectives is quite a simple task. The designer works through the map and formulates an objective at each point where the child is required to **do** something (eg. make a decision, demonstrate a procedure, summarise information). In this way objectives for knowledge and behaviours are identified.

The more precise the map, the easier it is to ensure that all objectives can be specified clearly in terms of what the learner is required to do. At this stage, the designer is able to check the instructional map for omissions or unnecessary inclusions. The map can then be revised and refined. All the sub-instructional objectives can be grouped together (eg. all those relating to one concept or procedure) to form lessons or units of related objectives. The designer is then in a better position to organise the logical flow of the whole course.

By writing objectives which specify the situation, the capability, the object, the action, the tools and constraints, the consequences of appropriate and inappropriate action and the degree of mastery required, the designer can later construct testing procedures which are congruent with the stated objectives.

A major problem with many research studies into child road safety education has been in the area of objectives and subsequent testing of responses. Furthermore, many researchers have not specified objectives in even the most

broad categories of knowledge and skills, and no study to date has attempted to formulate objectives at each point at which the child is required to-respond.

However, it is evident from the more recent pedestrian studies, that tasks are being analysed, and objectives are being operationalised and structured hierarchically (van der Molen, 1981; Vinje, 1981; Limbourg & Gerber, 1981; Rothengatter, 1981; Singh, 1982; Sheppard, 1975). Furthermore, studies using these techniques are better able to be evaluated and thereby help to form a body of hard facts which are lacking at this time (Vinje, 1982: 235).

Constructing Training Strategies

Having developed an instructional map and grouped objectives together, appropriate communication sequences can be selected. Research has identified techniques which have been designed to ensure effective instruction. The

following variables have been found to be important:

- * Presentation Sequences

The presentation sequence in lessons ought to follow this pattern:

1. Brief explanation.
2. Demonstration.
3. Modelling of behaviour by learner.
4. Prompting of behaviours by teacher (using verbal cues).
5. Shaping of behaviour by teacher (if necessary, physical prompting).

- * Behavioural Sequences

Learning occurs best when responses are reinforced in some way.

Reinforcement works best when:

- It is spaced over intervals.
- It is unpredictable.
- The ratio of positive reinforcement to mild reprimand is about 80:20.

Studies using Training Strategies (Tables 2.7, 2.8) have identified a significant effect on training if the above strategies are used in teaching various aspects of pedestrian safety. Unfortunately, no studies have been undertaken in the other three road user categories to demonstrate the effects of training strategies on road safety knowledge and behaviours of children.

The role of sequencing needs specific mention as, although the more recent studies state that tasks have been analysed and sequenced, it is usual that the sequencing moves from simple to complex. In Contrast to this usual procedure, the present model would advocate the design of sequences to move from general to specific. Using this procedure, maximum amounts are able to be taught in the least time. This is made possible by determining which areas are generic, or common, across the widest number of applications (Engelmann & Carnine, 1982).

Vinje (1981: 236) has recognised the problem of sequencing tasks from simple to complex as the following quote highlights:

... many of the subtasks of the task analysis ... amount to almost the same type of task, but under different circumstances. For example, detecting oncoming traffic while standing on the side of the road (pavement) is not radically different from detecting traffic while standing in the middle of the road, although the latter task may be somewhat more complicated...

It would seem desirable that future designs for instruction follow the model presented here, and sequence instruction from the general to the specific. Using this method, rules could be learnt which would apply to a large number of subtasks.

Selecting Media

Media should be selected according to the category of information to be learned, the capability required of the learner, and the sequencing principles to be applied. Problems inherent in the studies which consider a variety of media, are exacerbated by an apparent lack of understanding of the role of media in designing instruction. Media examples should not be separated from the objectives of instruction. Furthermore, to be most effective specific two-way media should be selected for each objective in the instruction sequence.

The researchers who have considered children's difficulties in correctly interpreting road safety posters, pamphlets, slides and films (Colborne & Sheppard, 1966; Firth, 1973; Vernon, 1962; Sheppard, 1975; Rothengatter, J., 1981; Singh, 1981) point to the necessity of linking specific media to specific objectives in the instruction process, and to the need for training strategies to be evident in the presentation of the media.

Defining Pre-Requisite Skills and Constructing Mastery Tests

If component skills and information have been analysed precisely, the designer is in a much better position to specify pre-requisite skills than if this were not done. The designer must know exactly what skills can be built upon, not just whether, for example, the child has a bicycle or has seen a video about bicycle riding. If the designer makes incorrect assumptions about previously acquired skills and does not test for the skills required, the instruction process will not work, and will be lengthier and more repetitious.

The concept of mastery (attaining the objectives!), is central to the instruction process. Tests are devised directly from the objectives and according to the desired standard. It is unsatisfactory to demand 100% mastery of riding skills from a learner rider, if you can only expect mastery level at an 80% level. Criteria should match the expectations of the course, not some other standard.

Again, the designer is able to check the analysis of content and the objectives. The 'don't teach what you don't want mastered' principle operates here. Conversely, if you want it mastered, 'teach it'!

The vast majority of child road safety studies have involved pre-testing, some kind of teaching, then post testing. Since the teaching has usually been in some unspecified form, rather than teaching to a specified criterion, the role of pre-requisite skills and mastery tests have been overlooked. Furthermore, these pre-test, post test studies seldom advance knowledge of the specific areas in which children have difficulties, with the result that the specific components of the instruction in the studies have remained untested.

Field Trialling and Modification

Lessons and modules are prepared then tested on sample learners. The primary focus here is not on how successful the instruction is, but rather on how or where the instruction failed. By defining mistakes, the designer can modify the training program. The types of errors made determine the changes. If children are having difficulties, there could be deficiencies in the way the material was structured, designed or sequenced. For example, additional branching may need to be built in, examples simplified or chains shortened. The skills of the teacher also need to be monitored and built upon if necessary.

A modified program should then be re-trialled. Unfortunately, there is no evidence of field trialling to locate how or where instruction failed, in any of the studies presented in this report.

Developing the Final Package And Quality Control

The purpose of this stage is to produce the prototype package together with evaluation procedures. The designer needs to monitor:

1. Amount of time taken by learners to reach competency levels.
2. Mistakes made by learners which may require further modifications to the program.
3. Costing of the training programs.
4. Durability over time.
5. Social acceptability of the program by learners.
6. Supply-demand productivity improvement as a result of training.

Although the designer may want to know opinions about the course or whether children like the material, the crucial issue should always be whether the instruction succeeded or failed in meeting the objectives.

Summary

The model of instructional design proposed for use in developing school road safety education material utilises a process of continual refinement and analysis in order to ensure that the communication to the child is faultless. The designer works through eight stages which are interactive, in the sense that all 'grow' out of previous stages, and all shed a new or different perspective on each other.

The process is quite demanding in that inadequate or sloppy work on one stage will be picked up in later stages - mistakes cannot be covered up or missed.

A holistic approach to design is possible using this model since it draws together many different approaches to the design of instruction to form a dynamic and unified system.

Although no road safety research studies or educational programs have, as yet, used all the components of this model of instructional design, researchers and developers have identified as important, each of the component parts. The staged design approach has been formulated from an analysis of the principles of learning; of behaviour; of stimuli; and of knowledge systems in such a way that learning might occur more effectively and efficiently.

The model will be referred to in the following sections when an analysis is made of the instructional design of the major primary school road safety education materials produced for Australian schools. In order to analyse the instructional design of the major primary school road safety kits and programs, each kit will be presented in turn, and will be evaluated according to the eight stages of the model for instructional design.

4.3.3 Roadwork

In 1979, a primary school teacher was seconded by the Victorian Road Safety and Traffic Authority (RoSTA, which has now merged with the Transport Regulation Board to become the Road Traffic Authority [R.T.A.]). She carried out a literature review of material aimed at teaching road safety (Roberts, 1980) and made recommendations which led to the development of Roadwork, a kit of material for primary school pedestrian, passenger and off-road bicycle education.

Over the following two years, information was gathered from a variety of sources in England, America and Australia and by 1982 the Roadwork kit had been developed and trialled and was available for distribution. The kit was then sent unsolicited, and free of charge, to every primary and special school in Victoria.

The decision to distribute the kit in this manner was a deliberate one (Gardner, 1984a:10):

...the rationale? being the non-availability of manpower to contact schools, follow them up, despatch kits and engage in in-service training for teachers.

Whilst this may have been an efficient method for distributing the kit, it may not have led to the kit being effectively implemented. It was expected that through the use of the kit, primary school children would develop knowledge and skills in the areas of:

- * pedestrian safety
- * passenger safety
- * 'off-road' tricycle, bicycle safety.

Materials in the kit consist of:

- * teacher's guide
- discussion prints (poster size)
- * slide set (not sent with kit - ordered if required)
- * audio cassette of sounds
- * work sheets.

It is claimed (Hall, 19821) that the Teacher's Guide

is an attempt to provide teachers with a sequential approach to teaching road safety in primary schools.

and that (Hall, 1982:5)

Road safety education should be systematic and continuous, with knowledge (concepts etc.) and experiences (in the real world) being built up step by step.

The overall approach to achieving knowledge and skills is through:

- discussions
- * real traffic situations
- * classroom/school reinforcement.

The content of the **Teacher's Guide** is categorised into areas which include the following:

- Introduction
- About This Guide
- Introducing Road Safety
- Footpaths: Discussion and Reality
- Roads and Vehicles
- Speed
- Visibility and Pedestrians
- Safest Route to School
- Crossing Roads
- The Crossing Procedure
- Teacher's Notes

It is suggested by Hall (1982:6) that there is a sequence through the Teacher's Guide and that this sequence should be followed where possible. Two major evaluation studies of the kit revealed that the vast majority of primary school teachers in Victoria **were not** using the kit. Findings from the Dowse study (1984) suggested that of the teacher, surveyed:

- 75%** knew the kit **was** in the school
- 45%** were familiar with the components of the kit
- 22%** had used the kit
- 5%** were using the kit at the time of the survey
- 19%** knew a consultant was available
- 39%** knew the kit could be integrated
- 4%** had difficulty using the kit:
 - lack of time;
 - confusing Teacher's **Guide**.
- 65%** needed support services:
 - consultants to provide inservice to help with sequencing and implementing content and with the theory behind kit;
 - consultants to help link Roadwork and Bike Ed;
 - materials
 - how to **implement** kit
 - ways **other** schools used kit
 - update of materials
 - rural materials
 - videos, posters.

It would be seen from the Dowse study (1984) that extensive support services would be required if Roadwork is to be implemented by a greater proportion of teachers.

It could also be suggested that the design of the instruction included in the kit was such that the content was not analysed and presented in a clear, easy to follow manner.

A second evaluation of Roadwork was conducted in Victoria by Cardner (1984a,b,c,) who concluded the following:

- * The majority of Roadwork kits were sitting unused on shelves.
- * Difficult to identify users as materials sent unsolicited to all primary and special schools in Victoria.
- * Less than 10% of schools could be considered serious users of the kit.
- * In the 'less than 10% of schools' stated above perhaps only one teacher was using the kit therefore the percentage of primary school children exposed to the kit is extremely small.
- * Use seemed to be determined by individual teacher's enthusiasm rather than by a school based policy decision.
- * It was almost impossible to observe Roadwork being used:
Roadwork, we think, is used sporadically at unpredictable times.
(Gardner, 1984c:5)
- * Teachers found the contents of the kit valuable but had difficulties in knowing how to:
 - implement the program
 - integrate road safety into the curriculum
 - sequence the topics
 - devise activities suitable for young children.
- * Promotion, publicity, and inservice courses are needed.

The following material presents an analysis of the Roadwork kit according to the model for instructional design presented in Section 4.3.2.

Defining the Content to be included in the Roadwork kit.

In defining the content to be included in the Roadwork kit a variety of analyses were conducted. These included:

- * An analysis of road safety needs:
 - pedestrian and bicyclist crash data
 - where they occurred
 - who was injured.
 - characteristics of primary school children
 - physical
 - mental
 - emotional
 - social
- * An analysis of road safety tasks was conducted and the road safety content to be included in the kit was extensive. The road safety concepts included:
 - pedestrian
 - around home
 - local area
 - footpaths
 - roads & vehicles
 - speed
 - visibility & pedestrians
 - safest route to school
 - crossing roads
 - the crossing procedure.
 - bicycle — 'off road' discussion/demonstration only
- * An analysis of research results was conducted
 - literature review undertaken
 - books and kits reviewed.
- * Assistance also gained from curriculum personnel and teachers in the field.

There can be no doubt that a broad net was cast to gather information from which to design Roadwork.

Future re-developers of the Roadwork kit would find no trouble extending the content contained in the kit to include current results of research (including the results from this project) and current analyses of the road safety tasks in the three major areas of pedestrian, passenger and bicyclist behaviours.

It is perhaps in the area of analyses of tasks that a more concentrated effort is required. For example, if one aim of Roadwork is to develop 'off road' BICYCLE knowledge and behaviours then the content would need to highlight more than discussion and demonstration of the dangers of using bikes, trikes, skateboards 'off road' (Hall, 1982: photos: pps.16,18,19,21,26,35,40,45. Text: pps.16,17,26,34,35,40,46.) In these bicycle segments, the majority of photos and texts are concerned with footpath hazards. Very little content deals with knowledge and skills needed to be developed to cope with these hazards.

It is understood that some developers are hesitant about the inclusion of bicycle/tricycle education for young children and yet it is thought (Hall, 1982:34; Grieve, 1985:) that upwards of 25% of six year olds use two wheel bikes on the road. Surveys are needed to give a better picture of this use and to tap parental/societal and educational needs in the area.

For the area of RESTRAINT USAGE (Hall, 1982:34-37,42,85-86) further analyses are required of the knowledge children need and the skills they need to develop to recognise correct/incorrect adjustment, to fasten seat belts, and to analyse problems related to restraint usage. These analyses should be included in the definition of the content to be included.

Analysing the Content

The content included in the Roadwork kit has been presented in such a way that thirteen areas have been categorised in the Teacher's Guide (Hall, 1982). It was suggested by Hall (1982:6) that:

The Guide is not only organised sequentially, but in an 'ungraded' format.

However, assumptions about grading ARE inherent in the guide (Gardner, 1985: Personal Communication). Furthermore, it is unclear how the content analysis becomes a sequence in any but a loose connection of related areas. Sequence would appear to mean:

- * Work on white pages is considered easier than work on grey pages.
- * Both white and grey pages should be completed before the pink section.

Although the pink section (Crossing Roads) was considered to be the final section in the sequence. it was stated (Hall,1982:6)

...teachers may find it necessary to implement the Crossing Section earlier if they feel some children are at risk.

How to do this and when to do this was not at all clear.

It should be noted that an understanding and consequent use of instructional design procedures when developing educational materials is a recent phenomenon. However, it would be expected that the re-developers of the Roadwork kit would use the principles of instructional design when reorganising and analysing the content.

NOTE: The following suggestions are examples only. They are not exhaustive and have not been sequenced or grouped in final form.

In order to develop an analysis of the content to be covered, the following would need to be identified and defined:

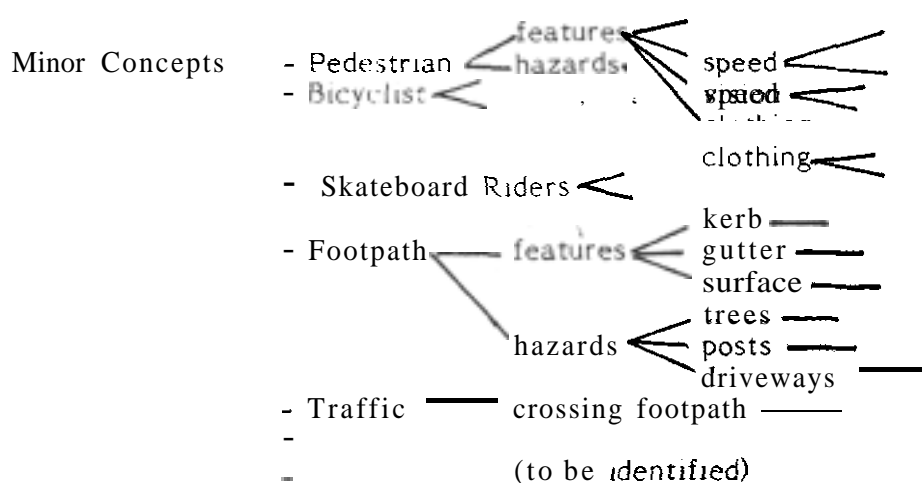
1. What concepts need to be developed?

Major Concepts which need to be developed should be identified and defined, e.g. Footpath Safety.

Definition: e.g. Footpath Safety is using the footpath without having a crash either alone or involving other people or things.

Minor Concepts related to major concept should then be identified and defined. These minor concepts could be written up on large sheets of paper or each minor concept could be written on a separate card and later grouped and sequenced. Minor concepts could be related to more than one major concept. An example of some major and minor concepts follows.

Major Concept - Footpath Safety



The above list is far from exhaustive. Space should always be available for 'other' concepts to be inserted as they are identified.

It should be noted that teaching a concept involves much more than presenting information and asking questions. If a child is to apply the knowledge, then procedures need to be built in by the DEVELOPER which will enable the child to use the concept in order to make decisions and solve problems. Hall (1982:6) suggested certain procedures for teachers to follow in the overall approach to Roadwork in that the approach followed the form:

- Discussion
- Real traffic situation
- Classroom/school reinforcement.

Perhaps REAL TRAFFIC could be replaced by simply using the term REAL provided the concept REAL was analysed to show the variety of situations/hazards/features. In other words there is more than one type of real situation.

Having decided what **concepts** need to be developed, the next step is as follows:

2. What information about each concept needs to be known?
 - e.g. What facts are needed: Footpaths are for pedestrians.
 - What classifications are needed: Types of footpaths, types of driveways, types of footpath surfaces, types of footpath hazards.
 - What evidence about the concepts is needed: Statistics on driveway accidents for 5 year old, 6 year olds etc; statistics on type of footpath crash.

What structures should be developed: Component parts of a footpath.

It is then necessary to formulate questions as follows:

3. Questions should be inserted to find out if children have learned:
 - the definition of the concept
 - information about the concept

Having developed concepts, children need to be able to do the following:

4. Children need to be able to DISCRIMINATE between concepts and then be able to compare and contrast concepts eg. discriminate between and compare and contrast types *of* footpaths; types of hazards; types of driveways. This cannot occur unless the child:

- * understands the properties of each of the concepts.
- * recognises the condition under which the concept being compared might affect the child.

If the former 4 points have been effectively designed, the child can be taught to solve problems:

5. Problem solving as a process.

Children need numerous concepts, the ability to make deductions, comparisons and contrasts **before** they can be taught the skills of effective problem solving.

eg. simulations of a variety of footpaths and hazards can be used in order to create new situations based on the concepts already taught. The process needs to move from simple problems, showing the steps of problem solving, and lead to more complex problems.

6. Procedures.

If a child is simply taught a series of steps (eg. kerb drill), the result is likely to be mistakes, incompetence and frustration. (Schreiber and Lukin, 1978a; Pease and Preston, 1967; Maggs, O'Brien and McMillan, in press). It is therefore necessary that decision points and consequences of particular actions are incorporated in the educational material. In this way, the child not only learns how to perform the task but why it is performed that way and what might happen if it is not performed according to the standard specified in the material.

In order that procedures such as some form of Kerb Drill might be taught, concepts need to be developed and discriminated and the child needs to be able to compare and contrast numerous concepts and develop problem solving strategies. Then decision points, consequences

and standards can be built in. The pink Crossing Procedure section (Hall, 1982:58-65) does depend on concepts being developed and does contain "Why and what might happen if?" sections. However, it does not explicitly state the relationship between this section and the earlier sections of the guide.

7. Previews and Summaries.

A preview of the content should be included at the beginning of each major concept area to be taught. In the Roadwork Teacher's Guide this exists primarily in the form of objectives. However there is no logical development of concepts and procedures and no summaries included which would help consolidate knowledge and skills. Summaries should be included and should mention each minor concept.

It should be noted at this point that although numerous concepts were included in the Roadwork kit, researchers who were appointed to assess the effectiveness of the kit (Gardner, 1985:Personal Communication) found it necessary to spend considerable time to ascertain:

- * the **3** major Roadwork objectives
 - * the 24 traffic environment 'elements' and the objectives for each 'element'
 - * the **26** traffic related concepts.
- (The full list is contained in Appendix J).

The researchers found it necessary to organise this disorganised information in preparation for development of test items.

Had the design of instruction of the Roadwork kit followed the model advocated by the researchers in this project then the test items would have flowed in a logical manner from the analysis of the content.

Setting Objectives

The primary reason for setting objectives for any learning experience is so that it can be determined ahead of time, what the child will be able to do after the experience. If the content to be learned has been analysed effectively, then the setting of objectives should be quite a simple task. Whenever children are expected to do something, there are usually concepts which need to be learned in order that they can respond appropriately.

If procedures have been analysed for necessary concepts and the concepts have been incorporated into the educational material with decision points included and standards specified, it is obvious that objectives can then be specified.

In the Roadwork Teacher's Guide (Hall, 1982) most sections contain objectives which state what the children will or should be able to do. However, the objectives are not the outcome of a logical analysis of procedures and related concepts. Decision points are not linked to procedures and no standards are set for performance. Furthermore, there are very many objectives implicit in the text that are not contained in the listed objectives.

For example, there are four objectives listed for the section Reality - At the Footpath (Hall, 1982:17). However the activities suggested for reaching these objectives are disorganised and frequently unrelated in any direct way to those objectives. None of the listed objectives (Hall, 1982:17) specifies

- investigating and measuring the
 - * width of a footpath;
 - * height of a phone box;
 - * diameter and circumference of a lamp post;
 - * depth of a gutter.
- Find the kerb
- Find the gutter.

However the text following the listed objectives contains these unspecified objectives. This is not an isolated case. Examples of unspecified objectives are contained right throughout the Teacher's Guide.

- * Consequences of appropriate/inappropriate behaviour. For example,
 - (i) child will be able to Identify the kerb by pointing to it.
 - (ii) child does not point to kerb and is returned to the point in the procedure at which the concept kerb is developed.
- * Mastery level expected - theoretically, all learned behaviours should be performed at 100% mastery or further tuition and/or practice should result.

In addition to the fact that all objectives implicit in the Roadwork Teacher's Guide were not specifically included in the list of Objectives is the fact that those that were included were not grouped together to form any sort of hierarchy of objectives. The re-developers should consider the following format:

- * Formulate a global objective, i.e. one which will help to determine the content of a program.
- * Specify instructional objectives, i.e. knowledge and skills analysis.
- * Specify sub-instructional objectives i.e. those objectives which cover each step in the learning process and are located as a result of thorough content analysis.
- * Terminal objectives i.e. those derived from the previous two types of objectives. They are therefore more precise, than the global objective allowing a more comprehensive statement about what the child will be able to do upon completion of the program.

Research studies are beginning to operationalise and structure objectives hierarchically (Sheppard, **1975**; van der Molen, **1981**; Vinje, **1981**; Limbourg and Cerber, **1981**; Rothengatter, **1981**; Singh, **1982**). Furthermore, studies and programs using these techniques will be better able to be evaluated as testing procedures can then be constructed which will be congruent with the stated objectives.

Developing Training Strategies

Studies have shown that the use of certain training strategies has a significant effect on learning (Reading, **1973**; Dueker, **1975**; Rothengatter and Brakenhoff - Splinter, **1979**; Rothengatter, **1984**). These training strategies (see Model for Instructional Design - Developing Training Strategies) include the following:

- sequencing
- modelling
- cueing
- shaping
- correction procedures
- feedback and rnasterv.

None of these elements are contained in the Roadwork Teacher's Guide in any but a very superficial form and certainly not in a logical form which will ensure mastery of the material. If the content had been thoroughly analysed then specific logical sequences would have been apparent. At every decision point in the procedure, the training strategies could have been applied.

Selecting Media

Media examples should not be separated from the objectives of instruction and the media contained in the Roadwork kit are (in the main) tied in to specific objectives. Media examples in the kit include the following:

Teacher's Guide pictures/sketches

Worksheets x 38

Discussion pictures x 10

Slide sets - 1 Roads x 6

- 2 Safe Places x 14

- 3 Crossing Situations x 5

Audio cassette - Sounds.

The re-developers of the Roadwork kit might consider 'slotting in' the media to be used for each stage in the procedure section of the analysis of the content. In this way teachers are able to easily see the relationship between the content and the media. The re-developers might also consider the development of further video tape presentation which depict urban and rural environments. In addition, consideration should be given to the development of computer software.

Defining Pre-Requisite Skills and Constructing Mastery Tests

It was mentioned previously that researchers appointed to evaluate the effectiveness of the Roadwork kit found it difficult and time consuming to sift out the major and minor objectives, concepts and elements contained in the kit (Gardner, 1984). In addition, there was a lack of logical content analysis and a resultant lack of logical sequences of activities throughout the kit.

It is not surprising then that pre-requisite skills were elusive and mastery tests not specified. However, the vast majority of the worksheets contained in the kit could be used for developing the knowledge component of mastery of each section. These worksheets could be linked to specific positions in the procedures and thereby grouped with specific sub-instructional objectives to form 'off-road' application of knowledge segments of lessons. Mastery tests for skills would also need to be developed and incorporated at specific points in the lesson, units and programs.

Field Trialling and Modifications

The process of field trialling is a crucial aspect of kit or program development in that if properly designed should lead to how and where the instruction failed and not merely to how successful the instruction was.

Future developers might consider the following;

- * specify standard of performance expected from the teacher and the children
- * conduct formative and summative evaluation
- * collect information which will assist in the design of corrections and modifications.

Developing the Final Package

The purpose of this stage is to produce the prototype package together with evaluation procedures.

The developers should monitor the following:

- * Amount of time children take to reach competency levels.
- * Mistakes made by children which may require further modifications to the kit.

- * Estimated r-a: ~~about~~ 10% of primary schools in Victoria use kit.
- Of primary schools that had ~~purchased~~ the kit and had responded to the questionnaire, 77% used the kit.
- * 67% of respondents believed kit should be compulsory.
- * 92% respondents had attended Bike Ed inservice course and found it valuable.
- * Bike Ed is ~~not~~ taught as a complete entity and the practical elements are the sections most often omitted.
- * Problems of staffing the Bike Ed Course and poor conditions of bikes affect implementation of Course.
- * Teachers disappointments included:
 - students do well: in class
 - : in playground BUT
 - few students actually use what they've been taught when out on the road.
- * Non users of the kit stated that:
 - pressures of other demands preclude Bike Ed:
 - too few trained teachers
 - practical activities too hard to implement
 - prefer one program Prep - Year 6

(Cardner, 1984a:33,21,25,28,29,31,32,51,38,41)

The following observations were made of classroom processes used or needed by Bike Ed users:

- * Many teachers didn't know that a video was available.
- * Teaching notes need to be more detailed.
- * The materials should be graded.
- * Photos and videos were needed to complement the posters/slides/diagrams.
- * Activities (Rodeo) not specifically related to road skills.
- * Children seldom asked to reflect on the reason for road rules or for performing particular actions.
- * BMX should be incorporated into the Course.
- * Children's Highway Code used as a resource.

(Cardner, 1984b:5-7)

For the development of the Education section of the plan, a primary school teacher was seconded in 1978 to RoSTA (see p. 103) to develop a research-based bicycle curriculum - the first in a series of ventures into curriculum development for the Road Traffic Authority.

The Bike Ed Course (Newlands, 1979) was first published in May 1979, was trialled and evaluated to assess its effectiveness, revised and reprinted in 1980. Unlike the Roadwork kit which was disseminated free of charge to all primary and special schools in Victoria, the Bike Ed Course ~~cost~~ \$75.00 and was only made available to people who had attended a two-day Bike Ed inservice training.

The Bike Ed Course aims to:

- * Teach safe bike riding techniques.
- * Teach road ~~law~~ and habits of care and alertness.
- * Impress on students that the bike rider ~~is~~ a part of the total road traffic network and must be capable of making responsible decisions in any situation instead of simply responding to traffic and taking chances. (Newlands, 1979, Introduction to the Bike Ed Course:14)

In order to achieve the stated aims, the following resources are included in the kit:

- * 7 teaching manuals - one for each unit plus Introduction manual and Rodeo manual
- * 1 student book - Bikes! Bikes!
- * 15 posters
- 2 sound/slide teaching units
- 7 card duplicates for photocopying purposes.

Newlands (1979:Introduction to the Course:14) states that Units 1, 2 and 3 may be attempted and completed in any order whereas Units 4 and 5 have the prior Units as pre-requisites.

A recent evaluation of the use made by teachers of the Bike Ed Course was conducted by Gardner (1984a,b,c). The following observations were made:

- * Estimated that about 10% of primary schools in Victoria use kit.
- * Of primary schools that had purchased the kit and had responded to the questionnaire, 77% used the kit.
- * 67% of respondents believed kit should be compulsory.
- * 92% respondents had attended Bike Ed inservice course and found it valuable.
- * Bike Ed is ~~not~~ taught as a complete entity and the practical elements are the sections most often omitted.
- * Problems of staffing the Bike Ed Course and poor conditions of bikes affect implementation of Course.
- * Teachers disappointments included:
 - students do well: in class
: in playground BUT
 - few students actually use what they've been taught when out on the road.
- * Non users of the kit stated that:
 - pressures of other demands preclude Bike Ed;
 - too few trained teachers
 - practical activities too hard to implement
 - prefer one program Prep - Year 6

(Gardner, 1984a:33,21,25,28,29,31,32,51,38,41)

The following observations were made of classroom processes used or needed by Bike Ed users:

- * Many teachers didn't know that a video was available.
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- * The materials should be graded.
- * Photos and videos were needed to complement the posters/slides/diagrams.
- * Activities (Rodeo) not specifically related to road skills.
- * Children seldom asked to reflect on the reason for road rules or for performing particular actions.
- * BMX should be incorporated into the Course.
- * Children's Highway Code used as a resource.

(Gardner, 1984b:5-7)

It would seem from the Cardner evaluation (1984a,b,c) that support services are essential if the Bike Ed Course is to be implemented in schools. In addition, promotion and 'after sales service' is crucial if schools are to be kept up to date with the full range of support (people and material) available to them. Furthermore, the more recent production of 'Bike Ed 20 Lessons Program' would suggest that teachers had difficulty using the Bike Ed Course in its initial form. Comments made by teachers (Cardner, 1984b:5-7) would support this claim.

The following material presents an analysis of the Bike Ed Course according to the model for instructional design presented in Section 2.2.

Defining the Content to be included in the Bike Ed Course.

In defining the content to be included in the Bike Ed Course, information from a variety of sources was collected. This included (Newlands, 1979a:91):

- * Analysis of road safety needs:
 - accident analysis from the Geelong BikePlan Accident Analysis 1975, including number of fatalities, injuries, causes of accidents.
- * Analysis of tasks for bicycle riding:
 - what children need to know
 - what children need to be able to do.
- * Analysis of research
 - Ceelong BikePlan
 - American research, especially work of Ken Cross (1978).
- * Analysis of other training courses including Queensland's Safe Cycling Course.
- * Assistance from the Ceelong BikePlan Subcommittee, teachers, bike enthusiasts and the Police Department.

As was the case for the Roadwork kit, a very broad and detailed set of information was collected.

Re-developers of the Bike Ed Course would need only to extend the content to include other major bike types, for example, BMX; update crash data (perhaps including a time line and comparisons with pedestrian and passenger crashes) and incorporate current research related to bicycle studies and instructional design when defining the content area for instruction.

One major decision which will need to be made relates to age for instruction. It is suggested that the Bike Ed Course ~~caters~~ for children **9-13** years and yet from the national data from this project, teachers are presenting bicycle safety lessons to children as young as Pre Year 1 (5 years old). From other reports (Grieve, **1985**; Ryhammar and Berglund, 1980; Arnberg et al, **1978**; Cross, **1978**; Gonski, **1983**), it would seem that some form of bicycle safety education should commence at an earlier age than 9 years. The decision about the age for instruction in the re-development of Bike Ed must be made in the light of evidence from research into the various aspects of bicycle use and not from personal feelings or beliefs about the wisdom of children riding on roads.

In fact, if a program or kit is developed which thoroughly analyses the content area to be taught, then age will not be a crucial factor in deciding whether or not children should experience the program. The decision will be one of 'What skills does the child possess?' 'What skills does the child need?' If the content has been effectively analysed then pre requisite skills can be isolated and tested and the child entered into a learning program.

Analysing the Content

The content included in the Bike Ed Course has been identified previously and is presented in some detail in the following discussion. It is suggested that a similar problem exists in the analysis of the content area in the Bike Ed Course as was apparent in the analysis of the content in the Roadwork kit. That is, an enormous amount of excellent material has been amassed to form the content of the course, and yet it is the analysis of the content and the subsequent formulation of objectives, evaluation items and the selection of media for each objective that causes concern and confusion for teachers. In short, the instructional design of the kit is such that logical sequences throughout the kit are not always apparent. This problem and related problems can be corrected in future re-development.

The content included in the Bike Ed Course has been presented for use in the following format:

* Manuals:

Introduction to the Course

Unit I Sharing the Road with Others - Road Safety

Unit 2 Bike Mechanics

Unit 3 Riding Skills

Unit 4 On-the-Road

Unit 5 The Road Test

Bike Rodeo

Bikes! Bikes! student book

* Posters:

10 x Unit I

3 x Unit 2

2 x Unit 3

* Sound/Slide Sets:

Set 1 Road Signs and Signals

Set 2 Riding in Traffic

* Cards for duplicating:

I x Introduction to the Course

- 2 x Unit I - pre test and post test
- worksheet for each slide set

3 x Unit 2 - 2 x bike safety check
 - 1 x bike parts

Unit 3 - score card

* Film: Can You Handle It? Surviving Bike Riding (1980).

The Bike Ed Course was not designed to portray a logical sequence of knowledge and skill development except for Units 3 and 4 which were dependent on the preceding units being completed. Rather, topics were constructed and resources developed from which teachers could develop programs and lessons for their children.

However, teachers had some difficulty in developing lessons and programs from the kit and hence supplementary material was developed ('The Bike Ed Course 20 Lessons Program').

The following examples from the Bike Ed Course are presented to show the lack of clearly sequenced procedures inherent in the Course.

EXAMPLE 1 - Unit I: Sharing the Road with Others - Road Safety.

The Contents page (p.1) identifies three very general areas to be presented in the unit:

- Teaching resources
- Issues that concern bike riders
- Test sheets.

No mention is made of what is contained in these sections. Furthermore, the contents page does NOT identify pages 2-4 which include:

- Resources for Unit I
- Suggested course plan
- Content which included embedded aims for Unit I
- **How** essential is this unit
- Your part (including testing for mastery)
- Note
- Student goals.

The first area identified on the Contents page is 'Teaching resources' and within this general area the following are discussed in the body of the manual:

- * Road Signs and Signals slide set 1 and audio 1-content in brief together with supplementary references and activities.
No mention is made of related posters or of related sections in other units.
- Riding in Traffic slides set 2 and audio 2 content in brief together with supplementary references and activities. One activity suggests introducing children to one of the posters.

The second area identified on the Contents page is 'Issues that concern bike riders' which contains references to the Ten Unit I posters with their accompanying information and activities. Surely the use of posters should be included in the teaching resources section which appears immediately prior to this area.

The other sections included within the second area include the following, in the order presented in the manual:

- * Bike riders and the law
 - equipment
 - riding bikes
 - towing bikes
 - more than 2 abreast
 - footpaths and reserves
- * Where should a bike be ridden?
 - refer slide set 2
 - refer poster 5.
- * Hand signals - refer slide set 2 and poster 5.

The next pages (9-21) contain the pictures and information contained on the first ten posters. However this fact is not communicated to the reader. An additional section is included (p.18-20 excluding poster p.20) in which the problem of making a right hand turn safely is presented and various solutions posed. No reference is made to slide set 2 No.s 37 and 40, which are concerned with this problem.

The issue of helmet wearing is raised on p.22.

The ~~third~~ Content area includes 'Test sheets'. These are of two types and include:

1. Pre and post test items
 - 20 items with separate answers for use prior to and after presentation of the slide/audio sets 1 and 2.
2. Worksheets for
 - Road Signs and Signals - 11 items
 - Riding in traffic - 11 items

The area of testing will be considered in the section concerned with pre-requisite skills and mastery tests. Suffice it to say here that there is no explanation for the required 85% mastery level on this pre and post test or any other tests.

The lack of explanation for the design of testing in the Bike Ed Course or for the necessity for achieving mastery on each task has led to researchers, evaluating the effectiveness of the Bike Ed Course, by comparing childrens' achievement levels i.e. norm-referenced testing, rather than by assessing the specific objectives of the Bike Ed Course i.e. criterion-referenced testing (see Trotter and Kearns, 1983; Kearns and Rothman, 1983).

In the studies cited above there was no attempt to train children to mastery levels in any of the areas of the course. In fact, the minimum 12 lessons for each experimental group (Trotter and Kearns, 1983:19,45) were completed in an average of less than 10 hours for Group A and less than 12 hours for Group B. It should also be pointed out that part of this time was taken up by the teachers preparing and organising for the lessons.

If the developers of the Bike Ed Course had been more specific about the need for mastery and how this was to be achieved and had built in correction procedures when they analysed the content of the Course then any normative testing would have been seen as an inappropriate method to use to evaluate the instructional design of the Course.

EXAMPLE 2 Bike Rodeo.

One of the problems in presenting Bike Rodeo as a separate resource is the fact that it is not specifically linked to the knowledge and skills developed in Units 1 and 3. Although the stated purposes for using the resource cover areas other than specific skill development it would seem that unless specific knowledge and skill objectives are included in the resource, the potential for 'misuse' of the resource is high. It is possible (as the present researchers, and the researchers in the Gardner study, [1984b:7] observed on a variety of occasions) for a 'Bike Ed lesson' to consist of some of the rodeo items without any link to road safety, either off or on the road.

Perhaps the re-developers of the Bike Ed Course could consider including wider goals, aims and specific objectives which, while clearly identifying the fun aspect of the rodeo, just as clearly link this aspect to the wider aims and objectives of the Bike Ed Course. For example, the rodeo event (Rodeo p.5) 'Riding Between Wooden Block Pairs' could be specifically linked to Unit 3 p.6 Obstacle Course. If the procedures had been clearly specified when the content of the course was analysed then these link points would have been obvious.

In sum, the analysis of the content in the Bike Ed course should be re considered by future re-developers. Some suggestions are included in the next section.

As was suggested for Roadwork, if the re-developed Bike Ed course is to be designed effectively so that learning, of both knowledge and skills is ensured, then certain procedures should be used when the content of the course is analysed. These include the following:

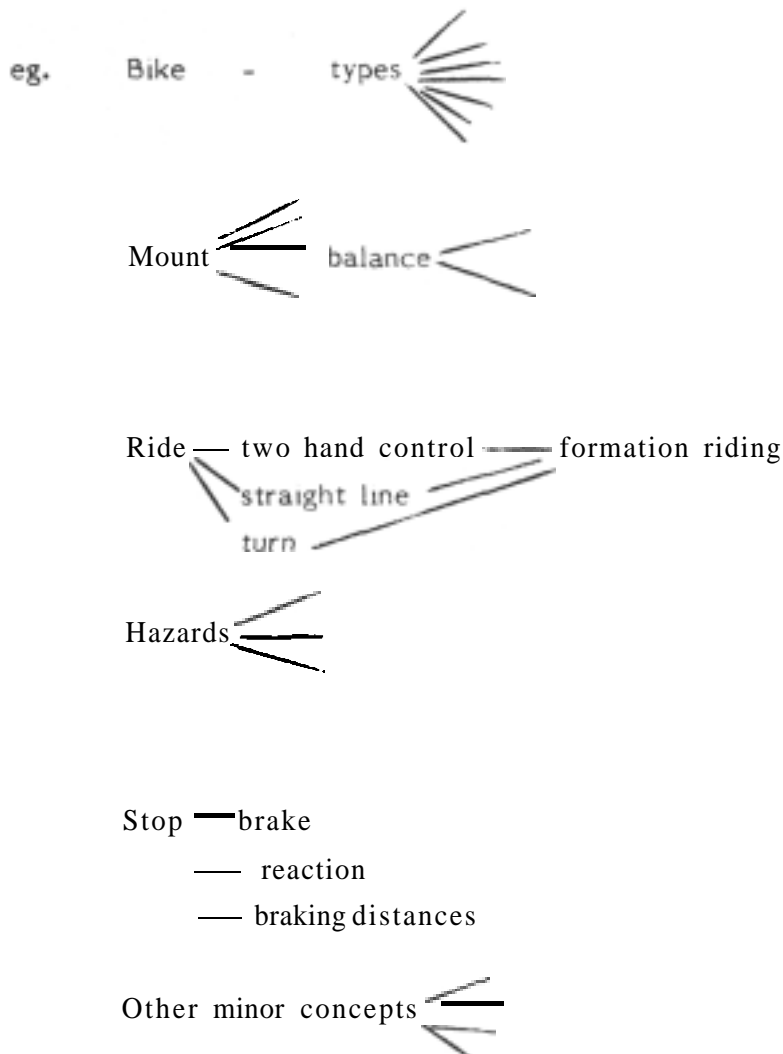
Deciding from the concepts collected:

1. What concepts need to be developed?

Major Concepts which need to be developed should be identified and defined.

eg. Bike Riding skills - the skills needed to mount a bike, ride a bike, (in spite of hazards) and stop a bike.

Minor Concepts related to the major concept should then be identified and defined.



Major and minor concepts are well identified and defined in the Bike Ed Course. The problem in the Course is one of sequencing the concepts and showing the relationships between them.

2. What information about each concept needs to be known?

As stated above, concepts are well developed but require linking so that relationships between concepts become apparent. A scope and sequence chart showing each concept and its relationship to other concepts should be constructed.

3. Questions should be inserted to find out if children have learned:

- the definition of the concept
- information about the concept.

Questions are not included in any of the Manuals not even Bikes! Bikes! the Children9 Manual. However, the pre-test, post test and the worksheets have questions to be answered. The posters contain three questions in total in the activities section of two posters (numbers 5 and 10).

4. Children need to be able to discriminate ~~between~~ concepts and to compare and contrast concepts.

This process would need to be extended in the course to show differences and similarities between the concepts.

eg. riders and non riders
balance and rodeo events
on road (different types) and off road (different types) of riding.

5. Problem solving as a process.

Children need numerous concepts, the ability to make deductions, comparisons and contrasts **before** they can be taught the skills of effective problem solving.

eg. In order to solve a problem related to a bicycle crash on the road, the children would need to have

- concepts eg. bike parts, traffic hazards and the minor concepts contained within these terms
- the ability to make deductions - if...then...
eg. if the bike was 100% mechanically then something else caused the crash..
- the ability to make comparisons and contrasts between concepts.

The skill of problem solving can be taught ~~and~~ can be sequenced as follows:

Step 1. Identify all the steps ie. concepts, deductions, comparisons and contrasts that need to be considered.

Step 2. Solve the problem by considering all from the first step.

Step 3. Eliminate steps and encourage children to create solutions.

Begin with simple problems, then add complexity as children learn the skills of problem solving.

6. Procedures

The content of the Bike Ed course has been analysed to teach concepts and facts and associated procedures. However, none of these areas has been analysed to include any classification, **of** the material to be taught, into a logical flow of information categories for instructional purposes. Neither has there been any attempt to chart the logical flow of the components of instruction. This lack of understanding of the crucial role of instructional design has lead to comment being made such as the following:

- * Children were seldom asked to reflect on the reason for road rules or for performing particular actions.
- * Bike Ed is not taught **as** a complete entity.
- * Rodeo ~~items~~ presented without any link to road safety, either off or on road.

(Cardner, 1984 a,b)

If a child is simply taught a series of steps or rules the result ~~is~~ likely to be **mistakes**, incompetence and frustration. Decision points must be included in the instructional design and consequences of right or wrong actions incorporated. If this is done the child not only learns how to perform a task but why it is performed that way, and what might happen if it is not performed according to the standard specified in the material. The reason for choosing the standard (or mastery) must be explained and the methods for achieving mastery made explicit.

7. Previews and Summaries

It has already been stated that the preview (contents list in the case of the Manuals) is inadequate. Furthermore there are no summaries which should state what has been covered and should mention each minor concept. This is to be expected as the Bike Ed Course was not designed to portray a logical sequence of knowledge and skill development.

Before leaving the area of content analysis one general point should be made. The re-developers of the Bike Ed Course should not be bound to the present Manual or Unit categories as they are arbitrary divisions not based on a logical analysis of the content for instruction.

Setting Objectives

Because of the problems inherent in the analysis of the content of the Bike Ed Course, objectives are not explicitly linked with one another to form en-route, sub instructional, instructional, terminal and global objectives (see Roadwork - Setting Objectives, p.113).

However, objectives are specified for the great majority of tasks, although frequently termed purpose, significance, test or simply embedded in the text. Re-developers should consider formulating an objective at every point in the content analysis at which a child is expected to do something. Having formulated the objectives, it is then critical that additional information is included, such as the following:

- * In what environment should the objective be achieved eg. on the road, off the road, up hill, down hill.
- * What does the child have to do?
 - give verbal information
 - use intellectual skills
 - use motor skills
 - develop attitudes i.e. make choices.
 - a combination of the above behaviours.
- * In what observable way?
- * Under what constraints or conditions?
 - e.g. - wet road
 - dry road.

- * Consequences of appropriate/inappropriate response.
e.g. appropriate response - move to next section;
inappropriate response - return to program.
- * Mastery level expected - in most cases an arbitrary **85%** mastery has been set for tasks in the Bike Ed Course. There is no explanation as to why this level was chosen or what teachers should do to ensure that the child reaches the mastery level set.

Developing Training Strategies

There is no mention of the methods teachers should use to develop the required knowledge and skills in children. How to use modelling, cueing, shaping, correction procedures and feedback techniques to develop mastery in children is not discussed except for suggesting that certain skills are demonstrated. **If** the content had been thoroughly analysed then specific logical sequences would have been apparent. **At** every decision point in the procedure it would then have been possible to suggest suitable training strategies.

Selecting Media

There **has** been a definite attempt to link the media examples (slides, audio, posters) to the objectives of instruction. These examples will **of** course need upgrading to include current legal requirements for road users. **If** the content is re-analysed by the redevelopers then the media selected can be directly linked to each objective or in the training program. If this procedure is followed the media selected will aid mastery of the objectives.

Defining Pre-Requisite Skills and Constructing Mastery Tests

It was mentioned previously that mastery levels were set for various sections, e.g.

- Unit 1 **85%** mastery on post test i.e. child must get **17** questions right out of **20** questions.
- Unit 2 Label parts of bike with **85%** mastery. Other goals stipulated p4
- Unit 3 Test on riding skills - **25** individual tests worth **20** points each. Stated pass mark = **15** points. (**At** this level it would **be** possible to pass balance skills even if child falls off bike! p.19)

Unit 4 Practice for On the Road Riding. No mastery level stated.

Unit 5 The Road Test. 85% mastery which must include:

- stopping at stop sign
- giving way
- signalling and looking behind before merging right.

The standard set for performance is given as a percentage and there is additional information given to aid teachers to recognise when mastery has been reached. However, there is not sufficient information included to show the procedure to use if mastery is/is not reached.

If the objectives for the Bike Ed Course had been written to specify all the components of the instructional objectives then a very clear picture of expectations would have emerged. Again, because the content was not analysed to show the logical relationships between concepts, objectives, training strategies, media and testing, it can not be expected that pre-requisite skills would be easily identified or that mastery levels would be reached by all children.

It should be stressed that The Bike Ed Course is most effective in identifying individual concepts and objectives and gives much specific information about many of the components of the objectives. If time is taken to logically analyse the excellent content then the Course will flow more effectively.

Field Trialling and Modification

The Bike Ed Course was initially field trialled in Ceelong and Ballarat during Term II, 1979. The ~~aim~~ of that trial was (Newlands, 1979:97):

...to identify all the problems that teachers were likely to face...

The problems which emerged included:

- * Attitude of children to:
 - safe right hand turn
 - giving hand signals
 - wearing ~~visibility~~/safety gear.

- * Organisational problems of teachers:
 - groups too large to teach specific skills
 - no confidence therefore in-service necessary.

There is little evidence of formative evaluation having taken place in which the following procedures would have been used to locate problems with the design of the individual items of the instruction:

1. One-to-one clinical evaluation involving the developer working with individual children to locate where the instruction fails to be effective.
2. Small group evaluation of 10-20 children representative of target population.
3. A number of groups are exposed to the material in order to locate final problems in the instructional design of the kit.

The emphasis for this evaluation is on testing the links between each section of the instruction i.e. the procedures, in as real a setting as possible.

For summative evaluation, materials should be analysed in terms of content coverage, statement of global and instructional objectives and the relationship of the test instrument to those objectives. A diagnostic analysis of errors made by children is necessary if the design of the instruction is to be improved so that more effective learning might take place.

In sum, the content for the Bike Ed course was defined through a variety of in-depth analyses. However, the analysis of the content was too general and did not lead to a Series of logical procedures for instruction. These procedures should have classified the information for instruction into categories for instructional purposes. The categories would then have provided teachers and learners with an exhaustive listing of all knowledge, procedures and skills considered necessary. Because the content is not effectively analysed, the objectives and activities stated do not guarantee mastery of elements for the Bike Ed Course.

Future re-developers might be alerted to the various adaptations made to the Course by a variety of people including the adaptation made by the States and Territories road safety authorities or Education Departments, and the adaptations made by, or with, the aid of consultants (Cusack and Warner, 1985),

It should be kept in mind that re-development of the Bike Ed Course would necessitate re-constructing the total package with a probable emergence of quite different units.

4.3.5 Hector Cat Material

The Australian Department of Transport in co-operation with the Traffic and road safety authorities of the Australian States and Territories was responsible for the production of educational material utilising the fantasy animal character Hector Cat. The material was to be used to communicate road safety information to children 5-8 years.

The material was developed in series as follows:

- 1971** Hector Cat was introduced on a school calendar, who lost eight of his nine lives through ignorance of Road Safety practices.
- 1971** Film - 'Hector Goes to Play Ball' (9½ minutes duration) in which Hector Cat learnt about road safety through errors for which he was rebuked by singers on film sound-track. Road safety message embedded in story.
- 1972** Hector Cat calendar - A wiser Hector Cat more aware of road safety.
- 1973** Hector Cat calendar on which Millie Cat, Hector's girlfriend, first appears.
- 1974** Hector Cat calendar - Hector and Millie were married. Uncle Tom introduced as ignorant of road safety.
- 1974** Film - 'Hector and Millie save Uncle Tom' (14½ minutes duration) road safety message embedded in story.
- 1975** Hector Cat calendar introduces Hector and Millie's three kittens as innocents in need of road safety education.
 - comic books - Hector Cat - Secret Agent
 - TV segment (60 sec) 'Hector's School of Road Safety'.

An exploratory research study was undertaken (Schreiber and Lukin, 1978) to assess children's reaction to the materials. The major results of that research follow:

- Young children had an affinity for fantasy animal characters and enjoyed the Hector Cat material. However, these characters were not necessarily appropriate models for teaching road safety behaviour. Children were more likely to model people who they respected or who others respected.
- * The very short (60 second) film 'Hector's School of Road Safety' was more effective in communicating its road safety message than the two longer, story-line films. The clear, concise nature of the 60 second film led to greater recall of content about road safety. However the problem of Hector facing the audience in the kerb drill demonstration led to unclear communication especially to the younger children as Hector's left was to the right for children viewing the film.
- * Illustrations on the calendar were not always related to the road safety messages with which they appeared. The calendar seemed to be most clear to children when illustrations were simple, unambiguous and directly related to the written content on the page.
- * Children were unaware of the purpose of the material.
 - purpose lost in detailed plots and characterisations
 - children unable to sift information
 - not visually self explanatory
 - assumed higher reading proficiency than children (5-8 years) possessed.
- Children rote learned kerb drill and performed kerb drill as a 'magic rite' and not in a manner which led to safe road crossing behaviour.
- * Children's road safety kerb behaviour (measured in a simulated road environment) did not improve as a result of exposure to the 60 second film.
- * Many children do not comprehend instances of safe or dangerous behaviour.

Schreiber and Lukin's study (1978) pointed out a number of inadequacies associated with the Hector Cat material and suggested that future materials should be developed with these limitations in mind. Furthermore, it was suggested that future development should take into account child development

theory and evidence from road safety research.

The present researchers would also suggest that the design of instructional material is crucial in changing children's knowledge and skills. Schreiber and Lukin (1978) have shown through their results that, to be effective, the content of the Hector Cat material would need to be analysed, sequenced and presented to the children using effective training strategies.

In all fairness to the developers of the Hector Cat material, the bulk of analysed and synthesised research evidence in both the road safety field and the instructional design field has accumulated in the last ten years.

Defining the Content:

The Hector Cat material was developed in response to an analysis of road safety needs – children were over-represented in pedestrian crashes. In addition an analysis of road safety tasks led to the inclusion of the kerb drill as a suitable learning segment in developing pedestrian safety. However, an analysis of research, if undertaken, was not sufficiently extensive to include results of research into the use of film and printed material, eg. calendars in teaching road safety (Pease and Preston, 1967; Colborne and Sheppard, 1966; Vernon, 1962). There are other more recent studies in the area of media selection and use (Firth, 1973; Sheppard, 1975; Maggs and McMillan, 1985), but these of course would not have been available at the time of development of the initial Hector Cat materials.

Analysing the Content

There is no evidence of the content to be taught through use of the Hector Cat material being analysed and classified into categories for instructional purposes. There is no evidence of any but the most general 'rule analyses' of content and no evidence of any but the most general inherent objectives for teaching road safety. What concepts needed to be developed? What decisions did children have to make? What information did children need? How were rules best taught?

Training Strategies

A lack of understanding of the role of training strategies in designing instruction has led to serious problems in the Hector Cat material.

The role of modelling and the choice of model in affecting learning was apparently not considered and yet a wealth of information was available at the time (eg. Bandura, 1967;1969).

The training strategies of modelling, sequencing, cueing, correcting and reinforcement are not used to effect in the Hector Cat material and yet it is suggested (Rothengatter, 1981) that if instruction is via media, then training Strategies should be evident in the Presentation of the content. This research has however become available since the development of the Hector Cat material.

Selecting Media

Printed material (calendars, comic books) and films were the media through which road safety was to be developed and Hector Cat and friends were to models, appropriate and inappropriate road safety behaviours.

Research would suggest firstly that the most effective media are those that encourage a two-way communication eg. one way film supported by a second medium such as an instructor or a practical exercise. Hector Cat material does not present two way communication. Secondly, research suggests that if printed material is used, its effectiveness is dependent on factors such as the objectives of the training and the effectiveness of the sequencing, modelling, cueing, shaping and reinforcement (ie. training strategies) evident in the presentation of the material (Colborne and Sheppard, 1966; Firth, 1973; Vernon, 1962; Sheppard, 1975; Rothengatter, 1981). No evidence of systematic use of any of these features is evident.

Defining pre-requisite skills and constructing mastery tests

The Hector Cat material was a blanket approach to developing pedestrian safety rules for young children and no analysis of the pedestrian tasks were included in order to teach pre requisite skills in a structured manner. The material aimed to teach rules and achieved this through rote learning of the rules. As most of the material contained the road safety 'messages' embedded in story-line it is not suprising that tests of mastery were not included with the material.

Field trialling and modification

There is no evidence of the material being trialled in order to locate problems in the children's learning. The primary focus of trialling is not to see how successful the instruction is but rather to see where it failed. Once mistakes are defined, the material can be modified.

From this analysis of the Hector Cat material it can be seen that the design of the material was somewhat a fault if children's knowledge and behaviour with regard to pedestrian safety was to be developed. Research into the content area should have been more extensive. The content once defined should have been analysed so that knowledge and skills to be taught could have been sequenced and objectives formed for each of the sequences. Training strategies were not used to effect in the design of the material and there is no evidence of field trialling leading to modification of the materials so that effective learning might be assured.

4.3.6 Road Safety and Me

Research into methods for communicating road safety information to young pedestrians was initiated in early 1975 by the N.S.W. Department of Motor Transport (Schreiber and Berry, 1978:2). This initiation resulted in an exploration of the Hector Cat material (Schreiber and Lukin, 1978), and an exploration of the literature in the area of child development and children's performance of tasks related to those required for safe pedestrian behaviour.

The results of the exploration indicated the following:

- * Models are more effective if they are real people behaving competently in real traffic situations.
- Information should be communicated in a simple, direct manner.
- Educational experiences should promote an understanding of the child pedestrian as one component in the traffic environment.
- * Many children do not comprehend concepts such as safe/dangerous and therefore do not understand the dangers implicit in the pedestrian task.

The above findings indicated a need for new resource material for teaching pedestrian safety to young children and so the road safety kit 'Road Safety and Me' was developed in response to this need (Department of Motor Transport, 1979). An analysis of the instructional design of this kit follows.

Defining the Content

The content of the kit was defined as a result of the exploration discussed above. In addition, content samples were chosen which included the following (Teacher's Notes: Road Safety and Me: 1977:3):

children - their senses, responsibilities when interacting as part of the traffic system and the traffic environment.

Materials in the kit include the following:

- * Teacher's notes
- Pupil worksheets x 12
- * Coloured picture posters (488mm square) x 10
- * Audio cassette - Sounds x 1
- * Filmstrips with audio cassettes x 4

There is no evidence of a broad net being cast in order to gather information from which to develop an effective kit. There is no evidence of:

- * An analysis of child road crash data for child pedestrians.
- * An analysis of road safety tasks for child pedestrians leading to a logical sequence of tasks.
- * An analysis of a range of research studies from both child pedestrian safety and instructional design.

The content which was gathered for the kit was expected to be used by teachers (Teachers Notes:6) to:

move away from the rote learning and the kerb drill approach to traffic safety

..it must be used to stimulate student discussion and understanding.

Analysing the Content

The content of the kit has been analysed to include a detailed contents page, followed on subsequent pages by the focus question then, thinking, valuing, feeling and acting objectives. Following on is a discussion of the resource material and the physical activities and games included in the kit.

There has been an attempt to analyse the content into categories of information and concepts and generalisations to be developed (Teacher's Notes:7,8). However, only examples from the categories and lists of concepts are included. There has been no listing of all knowledge to be learnt and no emphasis on skills specifically related to pedestrian safety. In fact, the emphasis is

to stimulate student discussion and understanding.

(Teacher's Notes:6)

The physical activities which have been included in the kit are considered to be (Teacher's notes:6)

a vitally important part of the educational programme.

Of the 37 activities included, only 7 could possibly be directly linked to pedestrian tasks (discussions only) and of those 7 only 1 activity involved real traffic and then only in as much as children were to sit with their backs to a fence, listen to traffic sounds and then try to identify the sounds they heard.

It is highly doubtful if anything learnt during the 'physical activities' would generalise to the pedestrian tasks the children need to be able to perform in their daily lives. The rationale for including these types of activities needs further investigation.

In short the kit has not been designed so that the objectives, methods and evaluation procedures support each other in developing a logical sequence of knowledge and skills for pedestrian safety.

Setting Objectives

Objectives have been studied in four categories:

1. Thinking
2. Values
3. Feelings
4. Acting.

This categorisation is not the most effective classification for information, as it does not lead to a logical sequence of instruction from concept development to ability to make predictions and solve problems. If the classification of information suggested in this report had been adopted and used in analysing the content for instruction, then objectives would have been set at each point at which children were expected to do something and effective sequencing of instruction would have been automatic and obvious.

Problems related to the instructional design of the kit were noted by teachers who found the Teacher's notes in need of modification (Schreiber and Berry, 1978:9). Teachers suggested the following:

- * more specific instructions on the sequencing of the kit material
- * re-ordering of some of the manual's contents
- more specific guidelines on the discussion aspects of the kit.

Developing Training Strategies

As stated previously there is no logical sequencing apparent in the kit. Furthermore the use of cueing, correction procedures and feedback are not considered.

Selecting Media

The media selected has been described at length in the Teacher's notes (11-18). However, the media have not been selected according to the category of information to be learned. Furthermore research evidence would point to the necessity of linking specific media to specific objectives in the instruction process and for training strategies to be evident in the presentation of the media. Neither of these factors are apparent in the kit.

Defining Pre-Requisite Skills and Constructing Mastery Tests

As the content of the kit has not been effectively analysed it follows that pre-requisite skills would be elusive. No mention is made of pre-requisite skills or of instruction leading to mastery tests. It is suggested (Teacher's Notes:31) that:

The possibility of formal, quantitative evaluation of the effectiveness of this approach to road safety instruction is extremely limited ... Any formal testing situation would immediately eliminate the spontaneous component of ... road crossing behaviour.

The use of formative and summative techniques for evaluation and the formation of objectives which specify mastery levels were apparently not considered by the developers of the kit.

Field Trialling and Modification

The kit was sent to forty selected schools who had agreed to trial the material. Teachers responses to the section of the kit were sought. Children's learning was not assessed although pupils in thirty-one of the classes

appeared to be interested in the material most of the time.

(Schreiber and Berry, 1978:13)

It is very difficult to field trial and modify a kit which does not have instruction analysed so that test items can be developed. It should be remembered that the primary focus for trialling material is not to assess the success of the instruction but rather to assess how or where the instruction failed so that modifications can be made. There is no evidence that modifications as a result of child failure were made to any section of the kit following the trialling.

4.3.7 Children's Highway Code

The 'kit' was produced by the Commonwealth Department of Transport (1979) for 7-8 year old children and consists of:

- 8 posters (49 x 35cm) fixed together so that they will stand to show:
 - picture one side (sketches)
 - text on reverse side of previous picture.

Content - where to walk (footpath or right facing traffic)

- how to cross the road (kerb drill)
- where to cross the road (crossing or lights)
- where to cross the road (Policeman, traffic warden, at a corner)
- safe cycling (mechanics)
- safe cycling (tips for cyclists)
- Australian road signs.

- * Children's booklets containing similar sketches and text to the poster set. In addition, sections on:
 - travelling by bus
 - travelling by car
 - playing safely.

The kit contains information about road safety. There is no rationale to the poster set and three lines of rationale in the children's booklet. No preview of content is included in either poster set or children's book and neither is there any in depth analysis of content. Content consists of rules to follow as a pedestrian, passenger and cyclist.

There are no sequences included to help the teacher develop the suggested knowledge and skills and no stated objectives or related test items. In short, no instructional design to ensure effective learning of the material.

4.3.8 The Safe Cycling Course

The Queensland Road Safety Council designed the Safe Cycling Course to teach children 9-13 years the following:

how to properly ride a bicycle, while providing them with the necessary knowledge to recognise the hazards of modern traffic and how to avoid them.

(Queensland Road Safety Council, 1983 Safe Cycling Course, Instructors Manual:4 - hereafter referred to as the Manual)

The Course was based on the principle that

early knowledge and observance of traffic rules and regulations by youngsters will lead to automatic observation in adulthood.

(Manual:4)

The Safe Cycling Course kit contains the following material:

- Instructor's Manual containing Course format, objectives, the 4 information giving sections, plus take home test sheets for the first 3 sessions and the roadeo assessment sheets for the fourth session.
- * Flip charts made up of 8 colour illustrations related to Course instruction.
- Cyclist's Handbook related to Course content.
- * Name cards, Graduation Certificate, Bicycle Inspection Report, Attendance Roll.

An analysis of the Safe Cycling course using the model for instructional design follows.

Defining The Content

The content for the Course was defined by reference to two major analyses. The first was an analysis of cyclist crash data (Manual:1; Cyclist's Handbook:5) and the second an analysis of the Canadian Safety Council Approach to Bicycle Education (Manual: inside front cover) There is no reference in the Safe Cycling

Course material to the developers using the analyses of research conducted into bicycle education or the fact that the developers chose to limit the practical exercises of the Course to off-road, flat, simulated environments.

It should be mentioned that an analysis of the first edition of the Safe Cycling Course was used by the developers of the Bike Ed Course (Newlands, 1979b) in assisting their development of that course.

Analysing The Content

The content included in the Safe Cycling Course has been analysed to form four related sections in the Manual which include:

- * Cyclist and Vehicles
- * Cyclists in Traffic
- * Cycling Manoeuvres
- * Defensive Cycling.

The content in the Cyclist's Handbook consists of 28 related sections which are related in turn to the Manual. It is doubtful that the Handbook as a whole is suitable for 9 and 10 year olds. The readability level is above their level and the mass of information is rather daunting. The cartoon style pages (30-37) at least present a single message with a visual aid.

Each Section of the Manual is scripted to include 'What to Do' and 'What to Say' during the theoretical component of the session. There is a considerable amount of information presented in the 'What to Say' section and this information is not always presented in a way which would ensure logical development of concepts and related skills. For example (Manual:8), the Need for Signs and Traffic Rules section contains three questions in the 'What to Say' section:

- * Let's see how many traffic signs we already know?
(Children's responses written on board.)
- * Why do we have signs? (To tell people what to do.) There is no mention here about developing concepts which children can then use to make informed decisions.

- Have you noticed that not all signs are of the same shape and size? (Followed by the text - 'We will show you how to recognise all of these later on in the course'.)

That's all the development of 'The Need for Signs and Traffic Rules'. The next section of the Manual moves to responsibilities of Cyclists and Motorists in which 'The Queensland Traffic Code' book is discussed as something all drivers (including cyclists) must know and obey.

In spite of the problem related to the logical sequencing of concepts, there is an enormous amount of suitable information contained in both the Manual and the Handbook. However, rather than script the course in the Manual word for word, an instructional design procedure for analysing the content for instruction could assist in the development of a script. Such a script would ensure that the concepts and principles to be learnt are presented in a logical sequence.

The teaching of a concept involves much more than presenting information and asking questions. If the child is to apply the knowledge, then procedures need to be built in by the developer which will enable the child to use the concept in order to make decisions and solve problems. If separate theory and practical sessions are to be presented then direct links should be made between all aspects of both sessions.

Setting Objectives

Objectives are set for each of the 4 sessions and each of the 14 exercises. The concepts to be developed in the sessions are not listed in such a way that a logical progression through the session will link hierarchies of concepts so that the objectives may be achieved. The concepts and related skills to be developed during the exercise sections are stated and sufficient information is included from which tests could be developed.

Although there are terminal objectives for each session and test papers to be completed, there has been no analysis of the terminal objectives to form instructional, sub-instructional and en-route objectives (see Roadwork p.113). If this level of specificity is included then the test items are linked logically to concept development and the instruction is more likely to be effective.

Developing Training Strategies

The theoretical section of the Course consists of giving information and asking questions which require verbal answers from selected individuals. There is so much information to be given in the four sessions that a concentration on all children reaching a mastery level would require a different content analysis in which the role of training strategies would be *appropriate* and could be effectively included (for Training Strategies see p.99).

Selecting Media

Media examples should not be separated from the objectives of instruction and should be chosen to have a profound influence on the effectiveness of the learning expected to take place (Maggs and McMillan, 1985:4-2). The media chosen to be used during the theoretical sessions includes:

- The Cyclist's Handbook
- * Flip Charts

No additional media items are included for the 14 exercise sessions.

Films are not included in the course although teachers are advised to contact the Queensland Road Safety Council for any they might need.

Pre-Requisite Skills and Mastery Tests

Pre-requisite skills are not nominated except in as much as the theory and exercise sessions must be completed before the students enter the final exercise session - The Roadeo. If the students successfully complete the Roadeo it is presumed:

that the student will have sufficient knowledge of traffic rules and regulations, bicycle operation and defensive cycling to be allowed to ride on the road.

(Manual:67)

However, research would suggest that the skills developed in off-road cycling exercises are unlikely to generalise to other situations e.g. on-road riding (Wells, Downing and Bennett, 1979; Maggs and McMillan, 1985).

Tests with specific item checks have been developed for all theory sessions and the Roadeo. These could easily be used to test for entry knowledge and skills (pre-test) and could be used, with some re-organising, as mastery tests throughout the instructional sessions as well as tests at the end of a course.

Field Trialling and Modification

The Course was trialled in a number of schools and teachers suggested modifications.

Future re-development of the Safe Cycling Course might include re-analysis of the content of the Course according to the model for instructional design.

4.3.9 Traffic Safety Education Program for Primary Schools Incorporating the 'Careful Cobber Theme'

The program was developed by a primary school teacher attached to the Driver Education Centre of Australia (DECA, which was formerly Goulburn Valley Driver Training Complex).

The global aim of the Program was to encourage, what was believed to be a somewhat non-existent, primary school teacher awareness, interest and involvement in road safety education by developing a program that teachers would relate to, accept and present to children (Houlihan, 1986). To this end, the Program was developed and presented in grade level booklets which were easy to use and which were for use in conjunction with a primary school's Health Education Program.

Apart from the global aim of the Program to encourage teacher involvement in road safety education, the aims specific to the Program include the following for pedestrian, passenger and bicycle safety:

- * To develop the individual's skills to recognise and apply behaviour which reflects positive traffic safety attitudes.
- * To develop an understanding of factors which influence human behaviour in relation to traffic safety.

(Houlihan, 1981; Foreword to Program 5.1)

The activities are presented in separate Grade level books (Prep to Grade 6), again to encourage teacher awareness, interest and involvement. A Scope and Sequence Plan and a Foreword book are also provided. Related resource materials include:

- * The Careful Cobber Theme characters as glove puppets and as fibreglass cars (at DECA):
 - Careful Cobber
 - Mad Mate
 - Snake (under review in the current re-development of the program).
- * The Careful Cobber Traffic Safety Program presented at DECA.
- * Children's booklets:
 - Footpaths
 - Crossing the Road
 - Roads
 - Traffic.
- * DECA videos and related materials.

An analysis of the Program according to the model for instructional design follows.

Defining The Content to be included in the Program.

The formulation of the Program content arose from analyses of the following areas:

- * Health education (Draft Statements)
- * Primary Social Studies Program - Society in View
- * Primary School Curriculum Manual
- * Research on Traffic Safety Education
- * The Careful Cobber Project at the Goulburn Valley Centre (now DECA).

As was said for the Bike Ed Course and the Roadwork kit which have been analysed previously, the definition of the content to be included in this program and the other kits arose from in-depth analyses of a range of areas considered by the developers of the materials to be crucial. Perhaps an additional analysis which redevelopers might like to consider is an analysis of the research in the area of design of instruction. This issue will be further considered in the next section.

Analysing The Content

The well defined content area for the Program has been analysed to form the following categories:

- * Themes:
 - pedestrian
 - passenger
 - bicycle
- * Units of work:
 - teacher information - research findings
 - objectives - global
 - concept development
 - materials for each section of the activities
 - activities
 - .introduction
 - .experience
 - .culmination/evaluation
 - Careful Cobber Theme
- * Grade Level Books - Preparatory to Year 6
- * Foreword Book
- * Scope and Sequence Plan.

The content has been analysed in such a way that the three themes (road user categories) are, in the main, developed separately. Whilst this may be an effective division for the gathering of crash data, it may not be the most effective division for road safety education. If the content is analysed according to the model suggested for instructional design, then the divisions of pedestrian, passenger and bicycle safety would be effectively linked.

There is evidence of major and minor concepts having been defined and questions formed to informally test children's information about the concept. A scope and sequence chart is included in the Program. However, the chart does not show each concept and its relationship to other concepts. If the scope and sequence plan was to show an analysis of the content for instruction then all concepts that need to be taught could be listed and grouped. All facts could be stated, together with background information about each of the concepts and facts. General principles that govern the concepts could be specified and the program of instruction developed.

Setting Objectives

Global aims have been set for the Program as well as objectives for the three categories pedestrian, passenger and bicycle. However, the objectives in the main are not specified so that they relate to testable capabilities that children will have after completion of the instruction. For example, Grade One, Unit 1, Objectives:

To develop a knowledge of obstacles in the traffic environment which obscure vision.

What is it that the child will do to demonstrate achievement of the objective? Will the child list/recite/summarise orally or in writing the elements of the concept 'obstacle' with 100% accuracy whilst standing on the footpath?

Instructional objectives should move beyond the objectives as stated in the Program to include specific statements which contain all the components necessary for the objectives to be testable. If the content has been effectively analysed into categories of information for instructional purposes, then at each point in the procedure where a child has to do something (e.g. list, recite, demonstrate), an objective can be formed and subsequently tested. Suggested culmination/evaluation activities in the Program are related to the objectives for instruction. Testing would, however, pose a problem Since the objectives are not stated in testable form.

Developing Training Strategies

As stated previously, studies have shown that the teacher's use of certain training strategies has a significant effect on learning. These strategies include the following:

- sequencing of instruction throughout a lesson;
- modelling of appropriate behaviours;
- cueing responses;
- shaping responses towards mastery levels;
- correction of inappropriate responses;
- feedback to the child.

None of these strategies are explicitly discussed in the Program, although the first section of each unit contains Teacher Information. The information contained in this section acts as an excellent rationale for and summary of the unit. Future re-development might also include suggested Teaching Strategies to use to aid effective instruction.

Selecting Media

The program is constructed to include a list of materials suitable for each stage of the activities section of each unit. It is suggested (Houlihan, 1981: Foreword 5.2) that teachers could use classroom materials and other aids which are readily available to the teachers and children. When the Program is redeveloped, media could be selected and developed according to the information to be learned, the responses expected of the child and the specific objectives of the instruction process. Furthermore, teaching strategies should be included so that teachers may use them when presenting the media to children.

There was a deliberate policy on the part of the developers of the Program to exclude media such as worksheets and posters as teachers were encouraged to actively involve children in:

learning experiences conducted in the authentic situation.

(Houlihan, 1981: Foreword:4)

Pre-Requisite Skills and Mastery Tests

The Program consists of Grade level units of work which in the main expect a deeper level of knowledge of information as the child progresses through the Grades. Information is presented in all Grades so that it will lead to decisions being made and problems solved. The precise ordering of this information might be reviewed. The specific sequencing of instruction for developing off road/on road knowledge and practical skills in the three areas of pedestrian, passenger and bicycle safety is not sufficiently 'mapped' to show relationships between all concepts contained in the seven levels of the program. If the content had been thoroughly analysed then the relationship between all knowledge and all skills to be developed would have been apparent. Pre-requisite skills would then have been obvious and items for testing could be developed from each objective.

The Foreword to the Program (Part 6) suggests that the type of evaluation of the Program to be used by the teacher

will depend on what is being evaluated...An informal type of evaluation has been built into the units...observation, questioning and discussion...

This analysis of content in the Program has not lead to specific, measureable objectives being defined and hence it would be expected that evaluation would be general rather than specific. This is not the case. The evaluation items are far more specific than the objectives. Re-developers could move from evaluation items back to the objectives when re-writing future instructional objectives.

Field Trialling and Modification

The Program was trialled in sections as it was being written. Primary schools in reasonable proximity to OECA were used. The major aim for trialling the Program was to gauge whether or not teachers were interested, became involved and were prepared to teach the Program. The developers were well aware that although the development of child road safety knowledge and skills was the ultimate aim, teacher acceptance and use of the material was considered to be a pre-requisite for this development.

Evaluation of the Program

It is expected that studies will be conducted into the use of ~~the~~ Traffic Safety Education Program by primary school teachers. It is expected that these studies could suggest relationships between the use of the Program and yearly visits made (or not made) by school groups to DECA. From an informal assessment it would seem that teachers visiting DECA once a year are much more likely to use the Traffic Safety Education Program in their schools throughout all grade levels than those teachers not visiting DECA.

However, a teacher's use of and general appraisal of a program does not ensure that successful instruction has taken place. Data is also needed which will test the quality of the instructional program. This aspect will undoubtedly pose some initial problems for the researchers as specific test items do not emanate from the objectives as stated in the Program.

The effectiveness of Road Safety Instruction Centres (also referred to as Traffic Gardens, Regional Traffic Schools, Driver Education Centres) is often questioned (Rothengatter, T. 1977; Maggs, 1985). Common concerns voiced include the following:

- The area of the Centre is often flat for safety activities hence does not take into account the many and varied conditions of traffic
- * Children visit facilities once a year for approximately 2 hours.
- * Instructional presentations often do not include demonstrations of appropriate traffic behaviours.
- * No pretest data, interaction and maintenance data available of the effectiveness of the Centre.
- * Parents sometimes used to assist with the program, and yet no specific monitoring at home.
- * Preparing children for activities at the centre takes a lot of time.
- * Guidelines and in some cases programs made available to teachers but no supervision or evaluation conducted to identify implementation or outcomes.

To be effective the Centres would need to include the following elements (Maggs, 1985):

- * Regional planning essential.
- * Co-ordinate activities in relation to the Departments of Education, Health and Community Services.
- * Establish a range of traffic behaviours.
- * Set up an exemplary model in a school.
- * Validate curriculum materials.
- * Collect even N=1 data at baseline, intervention, maintenance and generalisation (evaluation studies).
- * Prioritize populations
e.g. **low SES**
high risk fatalities areas
'dangerous' environments.
- * **Analyse** high frequency traffic behaviours to be taught.
- Inservice and quality control of assistants engaged in the instructional **activities**.

The Traffic Safety Education Program produced by DECA (Houlihan, **1981**) is an attempt to move in the suggested direction. Teachers visiting DECA are sent a letter a month prior to their one day visit to the Centre. This letter includes a photo of the Traffic Safety Education Program with suggestions to the teachers about the off-road and on-road activities they should present from the Grade Level book suitable for their class. These activities should be completed during the month prior to the visit to the Centre. The one day at the Centre reviews and extends the school program and gives controlled practice of concepts being developed. Suggestions are made for follow-up activities to be presented back at school. As stated previously, studies are being planned to collect data on the effectiveness of the instruction of both the DECA program and the Traffic Safety Education Program conducted in schools by classroom teachers.

The ~~initial~~ goal of the Traffic Safety Education Program was to encourage teacher awareness and interest in school road safety education beyond the 'once a year' visit to DECA. It is believed that this has been achieved (at least in the Goulburn Valley District) and that future goals **will** emphasise and test the effectiveness of the instruction presented in both programs.

Other Road Safety Instruction Centres exist in centres around Australia and each year are filled to capacity. They are not able to accommodate the large numbers of primary schools which seek to use their facilities and expertise annually and are obviously seen by teachers as a necessary component in the road safety education of children.

The instruction designed by these Road Safety Centres should be evaluated and their programs extended into the schools. The annual visit to the centres may then be better able to provide a review and extension of the formal school program. The visit to the Centre may also be used as an inservice day for the development of teachers' knowledge, skills and attitudes with regard to primary school road safety education.

4.3.10 Ride For Your Life Road Safety Resource Kit

This kit was produced in 1980 with a limited budget, to meet the need for bicycle education resource material in upper primary to lower secondary schools (Road Safety and Driver Education Project, 1985).

The kit consists of a collection of previously produced and new pic-a-paks on such topics as:

- traffic lights and road signs
- Walk - Don't Walk?
- Ride For Your Life Road Safety Resource Kit.

Each section of the kit is separate and contains sufficient content (except perhaps for updates of legislation and research) from which effective instruction could be designed. The content includes:

- Teachers notes with information for each concept.
- * Slides in the form of strip film.
- * Overhead transparencies for some sections.

The developers are well aware of the limitations of the kit which include:

- Presentation of kit (7 separate plastic packs held shut with sticky tape; many single pages of paper and overhead sheets; teachers notes in booklets and teachers notes on A4 stapled together).
- No scope and sequencing suggestions which might link the material.
- No preview or summary of the materials in the kit.

- * Not presented as a well designed instructional package which teachers could implement easily and which would contain the following:
 - An explanation for the choice of content in the kit.
 - Content analyses according to the categories of information being taught.
 - Objectives specified for each section of the analysis of content where a child is expected to do something.
 - Media selected and related to specific objectives.
 - Skills analyses so that a sequence is obvious and mastery tests can be constructed.
 - Field trial of the material leading to modification and final package.

The developers recognise the need for effective presentation and accessibility of the materials. In addition, they recognise the necessity for materials to be easy to use and effective for instructional purposes. It is suggested that if the material is designed for effective instruction then the developers will consider the above suggestions when redesigning the materials.

4.3.II Summary

The major kits and programs currently in use in primary schools across Australia can be divided into the following groups:

1. Those produced and disseminated by the Federal Office of Road Safety. These include Hector Cat materials and Children's Highway Code. Although these materials are considered 'out of date', the material to replace them has only recently been disseminated and was not in use at the time of this survey.
2. Those produced by the individual states and used almost exclusively within that state. These include:
 - * Road Safety and Me (NSW)
 - * Safe Cycling Course (Qld)
 - * Careful Cobber (DECA, Vic)
 - * Ride for Your Life (SA)

3. Those produced by an individual state and used or adopted by other states or territories. These include the two Victorian kits:
 - Roadwork
 - * The Bike Ed Course.

All the kits or programs have been developed as a result of a perceived need for effective road safety education for primary school children. This need has been determined by analysing a variety of material such as child crash data, effectiveness of existing material, child development theories and road safety research.

Various aspects of road safety research need further examination by developers if future materials are to be developed so that instruction will be effective. These aspects include the logical analysis of the knowledge and skills to be developed in each of the road user categories under discussion. Once this analysis has been completed and procedures to be used throughout the kit or program have been developed, then the objectives can be stated, media selected and teaching strategies included.

The content for the major kits and programs was gathered from a variety of sources and the kits written and trialled before finally being sent to or ordered by primary schools. The analysis of the content in the kits and programs is not in keeping with current research into design of instruction and as a result all concepts are not stated and linked; objectives are not sequenced so that levels of mastery can be developed; Strategies which teachers can use to assist mastery are not included, media is often not included or not appropriate and the methods used to field trial the materials need analysing so that future trialling might become much more specific. To this end, trialling needs to include an analysis of the teacher's behaviour and most importantly, the children's behaviour and needs to measure actual changes in children's behaviour (knowledge and skills) during and after instruction.

Kits and programs vary enormously in their attempt to specify and effectively sequence the material for instruction. They could all be redeveloped and trialled to enable instruction to be mastered and teaching strategies to be included. Some kits would need minor adjustments e.g. The Bike Ed Course and The Careful Cobber Program whilst others would need considerable re-organisation.

CHAPTER FIVE : SUMMARY DISCUSSION AND RECOMMENDATIONS

5.1 Overview of the Project

The Federal Office of Road Safety, within the Department of Transport, commissioned Futuretech Pty Ltd to undertake a national primary School Road safety research project. The objectives for the project were fourfold and included the following:

1. To collate all major road safety programs used in Australian primary schools.
2. To determine the extent of use in schools of existing programs and to determine the quality with which they are taught.
3. To prepare two major sets of guidelines for the design of school road safety curricula. One for the developers of school road safety education material and another for primary teachers in the schools to help them select road safety materials.
4. To prepare a report describing and commenting on the results obtained from the study.

Objective Three was modified as a result of the following:

- * Information received by personal communication with developers suggested that guidelines would only be useful if the developers were involved in the design of such guidelines. In addition, the guidelines would need to include specific information to assist the development of specific materials.
- * As all the major road safety materials currently available to teachers are under review, it was not appropriate to develop guidelines for teachers, to help them select materials.
- * It was considered appropriate to extensively evaluate the major road safety materials currently available across Australia. Through this method, specific information regarding the effectiveness of the design of each of the major kits or programs would be available to all developers.

This project is the first attempt to explore and describe the development and implementation of primary school road safety education across Australia. In order to fulfill the objectives of the project certain procedures were adopted.

Analyses were made of several elements related to the road user categories of pedestrian safety, bicycle safety, restraint usage and alcohol and safety, from the perspective of primary school children. The elements included child road crash data, child road safety research studies, the development and dissemination of child road safety education materials and the teaching of road safety in the primary schools across Australia.

Analyses made of the first of these elements, child road crash data, led to a concern about the difficulties other researchers have had in gathering and interpreting this data. This concern is being addressed by the Federal Office of Road Safety. Methods have been developed to standardise the collection and analysis of Australian child road crash data.

Through analysing child road safety research it became obvious that the majority of studies were concerned with pedestrian safety education. Fewer studies were available for bicycle safety education and even less for restraint usage. Research into alcohol and safety education, as it relates to primary school children was virtually non-existent, although attempts have been made to gather data which will assist in defining the content area for possible instruction.

The factors which have emerged from studies of children in the four road user categories of pedestrian safety, bicycle safety, restraint usage and alcohol and safety suggest that the successful design of instructional material is dependent on an understanding of a number of principles of instructional design.

Although the majority of studies have compared such things as the use of various traffic situations, various methods for instruction and a variety of media types, the more recent studies have addressed specific facets of the instructional process itself. Tasks have been analysed, objectives have been operationalised and structured hierarchically. Content has been analysed in that knowledge and behaviours are being separated and sequences produced. Training strategies are receiving attention and would appear to be significant in developing positive road safety behaviours.

However, no study to date has attempted to combine all the elements known to be important in designing instruction. The model for design of instruction suggested in this project combines all of the important instructional design elements.

RECOMMENDATION ONE

That studies be developed for the four road user categories using the model for instructional design suggested in this project (Section 4.3.2). To do this, programs would need to be developed which incorporate the following in their development:

- Content clearly defined as a result of analysis of research, needs, tasks and performance of learners.
- * Content analysed so that information is classified into logical **categories** and sequenced for instructional purposes.
- * Objectives formulated at each point where a child is required to do something. Objectives then grouped to form lessons or units of related objectives.
- * Training strategies incorporated in the design of the instruction.
- * Media selected according to the category of information to be learnt and linked to objectives.
- * Mastery tests devised directly from the objectives.
- it Field piloting (trialling) to assess the progress of children on each instructional objective. The primary focus of trialling is to locate how or where the instruction failed.
- * Materials thus produced must be effectively promoted, disseminated and supported.

The final point in Recommendation One is a major concern. Primary school road safety education materials having been developed must be effectively promoted, disseminated and supported. This is not an easy task in the current educational climate in which primary schools are relatively free to determine their own curriculum priorities. The challenge developers face is to encourage potential users (principals, teachers, school councils, etc) to consider, purchase, and adapt or implement materials in a situation over which developers have no direct control. Recommendation Two addresses this problem.

RECOMMENDATION TWO

That potential users of materials be made aware of, and accurately informed about, primary school road safety materials. The material must be seen by the potential user to be relevant to some problem of widespread concern - in this case road safety. In addition, the material must be perceived to be valuable and effective. If the material does not alter children's road safety knowledge and behaviour, then it is unlikely it will be seen to have value or to be effective. Potential users **need** to have **access** to a demonstration in which children are being instructed and they should perceive the material to be relatively easy to implement. This should be followed by opportunities for potential users to trial material with support from a 'consultant'.

5.2 Developers of Primary School Road Safety Education Materials (Report Section 4.1)

Most primary school road safety education materials were being developed, revised or adapted by both the road safety authorities (Federal, State and Territory) and the State or Territory Departments of Education. All developers were involved in developing materials in the four road user categories of pedestrian safety, bicycle safety, restraint usage and alcohol and safety. However, most activity was in the first two categories of pedestrian safety and bicycle safety.

There was considerable difference between the road safety authorities and the Departments of Education in the States and Territories with regard to the types of materials currently being developed for primary school road safety education. The emphasis in the road safety authorities was with the development of posters, leaflets, kits, guidelines and games and with the adaptation and revision of materials already in circulation. By comparison, the developers in the Departments of Education were mainly concerned with developing curriculum syllabus outlines in Health and Social Studies which contain sections on road safety; curriculum support materials; road safety policies; and with revising, adapting and integrating bicycle safety (Bike Ed predominantly) into the primary school curriculum.

A wide variety of methods were used by developers when developing materials. The most frequently used methods included firstly, a limited needs analysis eg. What do teachers want? What will they accept? Where are the gaps in existing materials? What do the Departments of Education want? A second method used by developers included an analysis of materials, prepared by other states and an analysis of Departments of Education curricula which contain road safety. Thirdly, information was sought from Departments of Education personnel, teachers and other relevant people.

The majority of developers of materials did not feel that they had sufficient information to effectively develop road safety education materials. Information needs varied between the developers in the road safety authorities and those in the Departments of Education. The developers in the road safety authorities considered that they had sufficient information from road safety research and statistical summaries of road crashes, and perhaps sufficient information about materials already in schools or available to schools.

They did not feel that they had sufficient information which contained critiques of materials already in schools, or of information about how children learn, results of surveys of teachers and parents, or information about how to design instructional materials for children.

The developers in the Departments of Education did not feel that they had sufficient information from any of the above areas.

High on the list of information developers would like to have, was information about designing effective instructional material. They would also welcome results of surveys of teachers and parents and reference lists with critiques of available materials. The Departments of Education developers would also welcome information from road safety research. Additional information required by developers included methods for integrating road safety into the primary school curriculum; methods for implementing the materials in schools; promotional strategies and how to apply road safety research. They would appreciate all of the required information published in accessible, simple, concise format.

Recommendation from report section 4.1.2. - 4.1.9.

RECOMMENDATION THREE

That a facility should be set up from which information can be disseminated to developers across Australia in both the road safety authorities and the Departments of Education. This information should not be disseminated in an ad hoc fashion. Rather it should be a kit of documents consisting of sections as follows: information from road safety research presented for separate age groups in the four road user categories; statistical summaries and descriptions of road crashes for separate age groups in the four road user categories; reference lists with critiques of all primary school road safety materials available; results of teacher and parent surveys and most importantly information about how to design effective instructional materials for children. The appropriate sections of the kit should contain national, State and Territory data to show inter and intra State and Territory differences. The kit should be loose leaf so that updating of materials is possible. Developers from the States and Territories should be involved in the process of developing the kit of documents. Leaders with instructional design expertise should be available to aid the development of a well designed kit.

5.3 Teachers of Primary School Road Safety Education (Report Section 4.2)

The teaching of primary school road safety was not considered to be a high priority with any State or Territory Department of Education. As a result, the vast majority of primary school teachers taught aspects of road safety on an incidental basis, as specific needs or problem arose. The most frequent method used by teachers was class/group discussion using pamphlets and posters.

Less than half the teachers surveyed claimed to use a kit or program in their teaching of road safety. The majority of those teachers that did not use a kit or program stated that they did not know what was available, they did not have any in their school or that which was available was inappropriate.

RECOMMENDATION FOUR

That road safety education materials should be Australian, modern, inexpensive, readily available, easy to follow, urban and rural in content, interesting, realistic and containing instruction suitably designed for pre Year 1 to Years 6 or 7.

RECOMMENDATION FIVE

That an annotated bibliography of national, State and Territory primary school road safety education materials be made available to teachers, together with critiques of the materials. This would suffice as guidelines for teachers until the current materials are redeveloped. Once this occurs consideration should be given to effective dissemination of materials and subsequent support of teachers (Recommendation Two).

RECOMMENDATION SIX

Teachers don't have time to develop kits or programs, therefore it is recommended that kits or programs be developed which are 'ready to teach' i.e. contain all necessary instruction and media suitably analysed to show relationships between objectives, media, testing and teaching strategies. Teachers should be made aware of the necessity for developing knowledge, procedures and skills in the road safety education of children, and not simply knowledge. Well designed instructional kits or programs, with effective promotional strategies at the point of dissemination, and support strategies for teachers, will ensure teacher awareness.

RECOMMENDATION SEVEN

That methods for dissemination of materials to schools be considered to ensure that teachers have access to well designed information about the materials. Sending materials unsolicited to all primary schools without effective promotional and support strategies should be avoided.

RECOMMENDATION EIGHT

That promotional strategies be developed to ensure teachers are kept aware of developments in primary school road safety education. In addition, teacher's should have access to 'experts', either at conferences, in-service courses outside the school or in-school courses.

RECOMMENDATION NINE

That teacher attitudes to teaching about alcohol and safety be considered. Teachers would need to be convinced that teaching about alcohol and safety in the primary years is desirable. To this end, kits or programs would need to be developed which contain justifications for each section of the content to be included.

RECOMMENDATION TEN

That teachers be given assistance in developing methods which involve parents in road safety education. Programs or kits developed for teachers should include extensions of the school program to involve parent support.

RECOMMENDATION ELEVEN

That rural schools need kits or programs which depict rural and urban situations so that comparisons can be made between the two.

5.4 Instructional Design of Major Primary School Road Safety Education

Materials (Report Section 4.3)

The major kits and programs currently in use in primary schools across Australia are concerned predominantly with pedestrian safety or bicycle safety. All general road safety kits or programs contain reference to restraint usage and in some cases activities are suggested to reinforce this usage. Alcohol and safety issues are virtually non-existent in the kits or programs and there were no separate restraint usage or alcohol and safety kits or programs available.

The kits and programs currently in use have been developed as a result of a perceived need for effective road safety education for primary school children and yet less than 40% of teachers claimed to use kits or programs in their road safety teaching. The percentage of teachers using any one kit was extremely low. This lack of use could be caused by any of a number of reasons including the fact that road safety education is not a high priority in primary school education; teachers don't have time; teachers need support to develop lessons from the material; the design of the instruction in the kits is such that the content is not effectively analysed and the objectives and activities stated do not guarantee mastery of the elements contained in the kits. Recommendation One addresses these issues.

General Recommendations Emanating From The Project

Road safety research would suggest that road safety education be commenced at an early age and yet little is known about the development of this education or the effectiveness of any materials which might be available.

RECOMMENDATION TWELVE

That a project be mounted similar to this primary school project which gathers information about the development, dissemination and implementation of pre school road safety education.

RECOMMENDATION THIRTEEN

That a profile be developed for 0-4 years olds with regard to on-road and off-road play and crashes. This profile should contain special information about the type of crash so that effective material may be developed and trialled with pre school children.

RECOMMENDATION FOURTEEN

That road safety education be seen as a continuum throughout life and materials be designed which depict the nature of this development in the four road user categories.

5.5 Conclusion

Road safety education is occurring in primary schools across Australia and materials to aid this education are being developed, revised or adapted by the road safety authorities and the Departments of Education. However road safety education is not a high curriculum priority in the schools with the result that this education occurs incidentally, as the needs arise and consists mainly of classroom discussion or yearly lectures given by outside people.

The major materials that are available to aid road safety education in the schools suffer from a lack of effective design of the instruction contained within them. Using what is now known of the learner, of learning behaviour, of systems of knowledge, and of essential qualities in instructional design, future developers will be able to produce effective road safety education materials provided that they are given support in their efforts to promote, disseminate and inservice their effectively designed materials.



REFERENCES

- Andrew, DH. and Goodson, L.A. (1980). 4 comparative analysis of models of Instructional Design. Journal Of Instructional Development, 3, 2-16.
- Arnberg, P.W., Ohlsson, E., Westerberg, A. and Ostram, C. (1978). The Ability of Pre-School and School Children to Manoeuvre their Bicycles. Linköping, Sweden: National Road and Traffic Research Institute.
- Australian Capital Territory Health Commission (1984). ACT Health Survey : Bulletin 1 : Survey of Year 6 to Year 12 School Students. Canberra.
- Avery, G. (1974). The Capacity of Young Children to Cope with the Traffic System : A Review. Report 8/74 Traffic Accident Research Unit, Department of Motor Transport, N.S.W.
- Bäckström, K. (1982). Prevention of Childhood Accidents in Traffic. Swedish Experiences. The Voice of the Pedestrian XVII, Spring.
- Bandura, A. (1967). Theories of Child Development. New York : Wiley.
- Bandura, A. (1969). Principles of Behaviour Modification. New York: Holt, Rinehart and Winston.
- Beeson, G.N. and Gunstone, R.F. (1975). The Teachers' Role in curriculum decisions. The Australian Science Teachers Journal, 21, 1, 5-19.
- Bell, D. (1978). Pointers to preventive measures derived from surveys on drug use. Australia Journal of Alcoholism and Drug Dependence, 5, 3, 82-85.
- Benjamin, ML. (1978). Alcohol Education in Schools. In Diehrn, A.P., Seaborn, R.F. and Wilson, G.C. (Eds.), Alcohol in Australia: Problems and Programmes. Sydney: McGraw Hill.
- Best, J.W. (1977). Research In Education. New Jersey: Prentice-Hall.
- Blum, H., Blum, E. and Garfield, E. (1976). Drug Education: Results and Recommendations. Lexington, Mass: Lexington.

- Booth, M. (1983). The Use of Restraints by Children in -Automobiles - 1983. National Roads and Motorists' Association, Sydney.
- Boughton, C. (1983). Introduction to Seminar The Role of Education in Road Crash Prevention. Conducted by the Road Trauma Committee, Royal Australasian College of Surgeons, Melbourne, Victoria.
- Bowman, J.A., Sanson-Fisher, R.W. and Webb, G.R. (unpubl.). Interventions in Pre-Schools to Increase the Use of Safety Restraints by Pre-School Children. Faculty of Medicine, University of Newcastle, NSW.
- Boyle, D. and Gilhooly, M. (1972) Conceptual Problems in Teaching Children Road Safety. Psychology Department, University of Aberdeen, Aberdeen.
- Brindle, R.E. and Andreassend, D.C. (1984). Where do Reported Bicycle Accidents Occur? The 12th ARRB Conference Hobart, Tasmania 27-31 August. Safety • Vol. 12 - Proceedings - Part 7 Australian Road Research Board.
- Brown, J. (1980). Road Safety Advisory Programme for Queensland Primary Schools Department of Transport: Queensland Road Safety Council.
- Child Safety Centre (1984). Analysis of Bicycle Accidents Seen At The Royal Alexandra Hospital for Children, January - December, 1983. Royal Alexandra Hospital for Children.
- Colborne, H.V. (1971). Two Experiments on Methods of Training Children in Road Safety, Report LR 404, Transp. Road Research Lab, Crawthorne.
- Colbourne, H.V. and Sargent, K.J. (1971). Survey Of Road Safety In Schools: Education And Other Factors. Ministry of Transport, Road Research Lab., Lab Report 388. Crowthorne.
- Colborne, H.V., and Sheppard, D. (1966). Testing a Poster for Infants. Safety Education, 107# 8-10.
- Commonwealth Department of Transport (1979). Children's Highway Code. Canberra: Aust. Government Printing Service.

Connel, WF. (1977). Curricula - school based or centrally prescribed? Parent and Citizen, 28, 4, 4.

Cross, KD. (1978). Bicycle Safety Education - Facts and Issues. Falls Church, Virginia: AAA Foundation for Traffic Safety.

Cusack, R. and Warner, D. (1985). Bike Education at Gulgong. The Primary Journal K-7, 2, 26-29.

Department of Motor Transport (1979). Road Safety and Me. Traffic Accident Research Unit Safety Kit. Sydney : Teaching Resources, NSW. Department of Education.

Donovan, C.L., Hagen, E.P., Homer, M.M., Kennell, MG. and Malfetti, J.L. (1982). Development of an Alcohol Education and Traffic Safety Module for Elementry School, Kindergarten through Sixth Grade Safety Research and Education Project Teachers College, Columbia University, New York.

Dowse, K. (1984). Roadwork Survey, November 1983 - Results. Victoria: Road Traffic Authority.

Dueker, R. (1975). Threat Detection Training Programs for Child Pedestrian Safety, Volumes I & II. Washington: National Highway Traffic Safety Administration.

Education Department, South Australta (1979). Road Safety and Driver Education Syllabus Outline and Curriculum Guide R-12. South Australia: Government Printer.

Elliott, B. (1985). Children and Road Accidents: An Analysis of the Problems and Some Suggested Solutions. North Sydney, Australia: Elliott and Shanahan Research.

Embry, D.D. and Malfetti, J.L. (unpubl.) Reducing the Risk of Pedestrian Accidents to Preschoolers by Parent Training and Symbolic Modeling for Children: An Experimental Analysis in the Natural Environment.

- Embry, D.D. and Malfetti, J.L. (1984). Symbolic Modeling: A Method to Reduce Children's Accident Injury. Resubmitted to Journal of Pediatric Psychology, October.
- Engelmann, S. and Carnine, D. (1982). Theory Of Instruction: Principles and Application. New York: Irvington Publishers Inc.
- Federal Office of Road Safety (1985). Personal Communication.
- Firth, D.E. (1973). The Road Safety Aspects of the Tufty Club. Department of the Environment, Transport and Road Research Laboratory, Laboratory Report 604. Crowthorne: TRRL
- Fisk, A. and Cliffe, H. (1975). The Effects of Teaching the Green Cross code to Young Children. Report 168 UC, Transp. Road Research lab., Crowthorne.
- Fleming, D. (1981). The Use of Restraints by Children in Automobiles. Sydney: National Roads and Motorist Association.
- Foot, H.C., Chapman, A.J. and Wade, F.M. (1982). Pedestrian Accidents: General Issues and Approaches. In Chapman, A.J., Wade, F.M. and Foot, H.C. (Eds.) Pedestrian Accidents. New York: John Wiley and Sons.
- Fortenberry, J.C. and Brown, D.B. (1982). Problem Identification, Implementation and Evaluation of a Pedestrian Safety Program. Accident Analysis and Prevention, 14, 4, 315-322.
- Freedman, K. and Lukin, J. (1977). Occupant Protection for Children: A Survey of Restraint Usage and Knowledge. Report No 8/77. TARU: Department of Motor Transport, Sydney.
- Cardner, P.L. (1985). Personal Communication July 1985: Monash University.
- Cardner, P.L. (1984a). Evaluation Of Road Safety Education Materials Volume 1: Implementation Of Three Sets Of Instructional Materials. Report to Road Traffic Authority of Victoria by P.L. Gardner and The Evaluation Studies Group: Monash University.

- Gardner, P.L. (1984b). Evaluation Of Road Safety Education Materials Volume 2: Classroom Processes And Implementation Strategies Report to Road Traffic Authority of Victoria by P.L. Gardner and The Evaluation Studies Group: Monash University.
- Gardner, P.L. (1984c). Evaluation Of Road Safety Education Materials Volume 3: Summary And Recommendations. Report to Road Traffic Authority of Victoria by P.L. Gardner and The Evaluation Studies Group: Monash University.
- Geelong Bikeplan (1977). Geelong Bikeplan Study Report. Geelong Bikeplan Committee, Victoria.
- Geelong Bikeplan (1980). Bicycle Enforcement. Technical Bulletin 4: Geelong Bikeplan.
- Gonski, L. (1979). Bicycle Accidents in Childhood. Medical Journal of Australia, **2**, 270-271.
- Gonski, L. (1980). Bicycle Accidents in Childhood. Child Safety Centre, Royal Alexandra Hospital for Children, Camperdown, Sydney.
- Gonski, L. (1983). Bicycle Accidents to Children. In Pearn, J. (Ed.). Accidents to Children. Their Incidence, Causes and Effects. C.A.P.F.A., Glebe, NSW.
- Gould, K. (1985). Life Education Centre Evaluation Report NSW Drug and Alcohol Authority Research Grant. Report Series B 85/2.
- Grant, M. and Ritson, B. (1983). Alcohol : The Prevention Debate. London : Croom Helm.
- Grayson, G.B. and Howarth, C.I. (1982). Evaluating Pedestrian Safety Programmes. In Chapman, A.J., Wade, F.M. and **Foot, H.C. (Eds.).** Pedestrian Accidents. New York: John Wiley and Sons.
- Grayson, G. (1981). The identification of training objectives : What shall we tell the children? Accident Analysis and Prevention, **13, 3**, 169-173.

Grieve, R. (1985). Personal Communication, Perth. July.

Hall, P.J. (1982). Roadwork - Road Safety for Primary Schools. Prepared by the Road Safety and Traffic Authority of Victoria in conjunction with the Education Department of Victoria. Melbourne: Govt. Printer.

Hardes, G; Alexander, H; Dobson, A; Lloyd, D; O'Connell, D; Purceil, I; and Leeder, S. (1981). Cigarette smoking and drug use in school children in the Hunter Region, New South Wales. Medical Journal of Australia, 1, 579-581.

Heywood, B. Programs. Keith Edmonston Regional Traffic Safety School. Ballarat, Victoria, Australia.

Hofmeister, A and Maggs, A. (1984). Microcomputer Applications in Education and Training. Sydney: Holt, Rinehart and Winston.

Hornel, P; Fiaherly, B; Trebilco, P; and Dunoon, D. (1984). Highlights of the 1983 Survey of Drug Use by Secondary School Students in New South Wales. Sydney : NSW Drug and Alcohol Authority Report A 84/4.

Houlihan, J. (1981). A Traffic Safety Education Program Incorporating The Careful Cobber Theme. Victoria: Goulburn Valley Driver Teaching Complex.

Houlihan, J. (1986). Personal Communication, March.

House of Representatives Standing Committee on Road Safety (1978). (HORSCORS) Motorcycle and Bicycle Safety. Canberra: Australian Government Publishing Service.

House of Representatives Standing Committee on Road Safety (1984). (HORSCORS) Report on Road Safety Generally. Canberra: Australian Government Publishing Service.

Johnston, I (1983). Scientific Evaluation of a Road Safety Education Policy. Paper presented at Seminar The Role of Education in Road Crash Prevention. Conducted by The Road Trauma Committee, Royal Australasian College of Surgeons, Melbourne, Victoria.

Jolly, K. (1977). Children and Traffic Vols. I, II and III, London: Methuen.

- Karmel, P. et al. (1973). Schools in Australia. Report of the Interim committee for the Australian Schools Commission, Canberra: Australian Government Publishing Service.
- Kearns, I. and Rothman, J. (1983). Follow-Up Study: The 'Bike-Ed' Bicycle Education Course. Research Note 6/83. Traffic Accident Research Unit: Traffic Authority of New South Wales.
- Kemp, B. (1979). What is school-based curriculum development? Contemporary Issues 9. Department of Education, NSW.
- Kerlinger, FN. (1979). Behavioural Research: A Conceptual Approach. USA: Holt, Rinehart and Winston.
- Lane, JM., Milne, P.W. and Wood, HT. (1983). Evaluation of the 1981/82 Rear Seat Belt Campaign. Road Safety and Traffic Authority, Hawthorn, Victoria.
- Lee, J. (1981). Accidents to Children: Playground Equipment and Bicycle Accidents. Child Safety Centre, Royal Alexandra Hospital for Children.
- Limboung, M. and Gerber, D. (1981). A Parent Training Program for the Road Safety Education of Preschool Children. Accident Analysis and Prevention, 13, 3, 255-267.
- Maggs, A. (1985). Instruction in a Traffic Safety School. Report to the Federal Office of Road Safety. Sydney: Futuretech Pty. Ltd.
- Maggs, A., O'Brien, P. and McMillan, K. (1984). Instructional Design and Behavioural Technology: Developing Cost Effective Systems. Paper presented to Thirteenth International Conference - IFTDO; Eleventh Regional Conference - ARTDO; Seventh National Conference - AITD. "1984 - The Future is Now". August 8th, Sydney.
- Maggs, A. and McMillan, K. (1985) Instructional Design : A Process for Education and Training. Sydney: Futuretech Pty. Ltd.
- Maggs, A., O'Brien, P. and McMillan, K. (in press). Instructional Design Technology. Sydney: Futuretech Pty. Ltd.

- Manders, S. and Hall, P.J. (1984). An Evaluation of some Aspects of the Essendon Traffic School. Research Report 91/01. Road Traffic Authority, Hawthorn, Victoria.
- Mathieson, J. (1984). Bicycle Safety in Australia: A Comprehensive Review. Review Based on a Paper presented to the National Road Safety Symposium, Canberra, 29-31 October, 1984.
- McKelvey, R.K. (1984). Can Children Learn to Discriminate Safe Road-Crossing Intervals? Journal of Safety Research, **15**, 57-67.
- McLean, A.J., Brewer, N.D. and Sandow, B.L. (1979). Adelaide In-Depth Accident Study 1975-1979 Part 3, Pedal Cycle Accidents, Road Accident Research Unit, University of Adelaide.
- Michon, J.A. (1981a). Preface. Accident Analysis and Prevention, **13**, 3, 161.
- Michon, J.A. (1981b). Traffic Education for Young Pedestrians: An Introduction. Accident Analysis and Prevention, **13**, 3, 163-167.
- Milne, P. (1983). Road Safety Curriculum Units. Paper presented at Seminar The Role of Education in Road Crash Prevention. Conducted by the Road Trauma Committee, Royal Australasian College of Surgeons, Melbourne, Victoria.
- Milne, P. (1986). Personal Communication - February.
- Newlands, J. (1979a). The Child Cyclist - An Overview of Training Methods and Protective Equipment. Paper presented to Seminar '80 "Kids use Roads Too". 6th Public seminar conducted by the Queensland Road Safety Council, Bardon, Brisbane, Queensland.
- Newlands, J. (1979b). The Bike Ed Course. Melbourne: Road Safety and Traffic Authority.
- Nummenmaa, T., Ruuhilehto, K. and Syvanen, M. (1975). Traffic Education Program for Pre-School Aged Children Starting School, Report 17, Liikenneturva, Helsinki.

- Nummenmaa, T. and Syvanen, M. (1974). Teaching Road Safety to Children in the Age Range 5-7 years. Paedagogica Europea, **9** 151-161.
- Nummenmaa, T., Syvanen, M., Kotakorpi, S., Lähdeniemä, E., Orell, R., Riekkinen, F., Toivoi, T., and Thoti, R.L. (1972). Pre-School Child in Urban Traffic, Report **68**, University of Tampere, Tampere.
- Organisation for Economic Co-operation and Development, OECD (1983). Road Transport Research. Traffic Safety of Children. Report prepared by an OECD Scientific Expert Group.
- Parker, A. and Cately, J. (1984). Bicycle Studies - An Australian View of the Integrated Approach. International Velo City Conference, County Hall, London. City Council, September.
- Pearn, J. (1984). Advocacy for Safety Education: The Doctor's Role. The Medical Journal of Australia. April **28**.
- Pease, K., and Preston, B. (1967). Road Safety Education for Young Children. British Journal of Educational Psychology, **305-313**.
- Preston, B. (1980). Child Cyclist Accidents and Cycling Proficiency Training. Accident Analysis and Prevention, **2**, 31-40.
- Preusser, D.F. and Blomberg, R.D. (1984). Reducing Pedestrian Accidents Through Public Education. Journal of Safety Research, **15**, 47-56.
- Queensland Road Safety Council, (1983). The Safe Cycling Course. Road Safety Council Queensland.
- Reading, J.B. (1973). Pedestrian Protection Through Behaviour Modification, Traffic Engineering, July.
- Road Safety and Driver Education Project (1980). Ride for Your Life Road Safety Resource Kit. South Australia : Department of Education.
- Road Traffic Authority (1983). Road Safety in Victoria. Road Safety and Traffic Bureau, Victoria.

Roberts, M. (1980). Appraisal of Existing Material Aimed at Teaching Road Safety. Report No. 1. Victoria: Road Safety and Traffic Authority.

Rothengatter, J.A. (1977). Traffic Training of Children, A Literature Review on the Basis of an Instructional Model. Report VK 77-05, Traffic Research Centre, Rijks Univeriteit Groningen, Groningen.

Rothengatter, J.A. (1981). The Influence of Instructional Variables on the Effectiveness of Traffic Education. Accident Analysis and Prevention, 13, 3, 255-267.

Rothengatter, T. (1977). Traffic Education in Traffic Training Gardens: A Literature Review. Traffic Research Unit, Institute of Experimental Psychology, Groningen University, The Netherlands.

Rothengatter, T. (1984). A Behavioural Approach to Improving Traffic Behaviour of Young Children. Ergonomics, 27, 2, 147-160.

Rothengatter, J.A. and Brackenhoff-Splinter, J.M.P. (1979) Report VK, 79-02 University of Groningen Traffic Research Centre cited by Rothengatter, T. (1984). op. cit.

Rothengatter, T. (1981). The Hoogkerk Experiment, Application and Evaluation of an Experimental Traffic Education Program for Pre-School Children. Traffic Research Centre, University of Groningen, the Netherlands.

Russam, K. (1975). Road Safety of Children in the United Kingdom. Department of the Environment, Transport and Road Research Laboratory, Laboratory Report 678. Crowthorne: TRRL.

Ryhammer, L. and Berglund (1980). Children and Instruction in Road Safety. The Voice of the Pedestrian, XIV, Autumn Uppsala Report on Education 8 University of Uppsala.

Sadler, J. (1972). Children and Road Safety: A Survey Amongst Mothers. London: Her Majesty's Stationery Office.

Sandels, S. (1975). Children in Traffic. London: Unwin Bros.

- Schnerring, F. and Norrish, J. (1984). Seat belt and Child Restraint Usage in Sydney Aug. 1983 Research Note RN 1/84 Traffic Authority: New South Wales.
- Schools Commission (1978). School-Based Decision-Making. Report of the National Conference, Sydney June 1-4. Canberra: Schools Commission.
- Schreiber, J. and Berry, C. (1978). Communicating Road Safety to the Young Pedestrian. NSW: Traffic Accident Research Unit, Department of Motor Transport.
- Schreiber, J., and Lukin, J. (1978). Communicating Road Safety to the Young Pedestrian Vols. I and II T.A.R.U. Dept. of Motor Transport, New South Wales.
- Shean, R. (1985) Alcohol Consumption in Adolescents Prevalence Survey. Australian Council on Smoking and Health, Perth.
- Sheppard, D. (1975) Teaching Pedestrian Skills, a Graded Structure Safety Education, Autumn, 13-17.
- Singh, A. (1976). Road Safety Education In Primary And Middle Schools. Department of the Environment, Transport and Road Research Lab., Supplementary Report 207 UC. Crowthorne, TRRL.
- Singh, A. (1982). Pedestrian Education. In Chapman, A.J., Wade, F.M., and Foot, H.C. (Eds.), Pedestrian Accidents. New York: John Wiley and Sons.
- Skilbeck, M. (1976). Support Structures for Curriculum Development: Scope and Limits. Paper presented to Conference on Support Structures for Curriculum Development, Canberra: Curriculum Development Centre.
- Snyder, M.B. and Knoblauch, R.L. (1979). Pedestrian Safety, the Identification of Precipitating Factors and Possible Countermeasures. Operations Research Report No. FH. 11-7312, US., Department of Transport, Washington, DC.

Stephens, M. (1978). Health and Traffic Education 5-13 and 13-18 in Traffic Education, 3, 18-20.

Strong, S., and Renkin, A. (1983). That's Just Something I Do In The Afternoons Sometimes. A study directed at the improvement of Traffic Safety Education in Victoria for the Road Safety and Traffic Authority. Hawthorn, Victoria.

Thompson, HC., Bornstein, S.L. and Connelly, J.P. (1980). Demographic and Socioeconomic Fact Book on Child Health Care. American Academy of Pediatrics, Evanston, IL.

Thompson, S; Trebilco, P; Flaherty, B; and Homel, P. (1985). Drug Use by Primary School Students in New South Wales. A 1983 Pilot Survey. Sydney : NSW Drug and Alcohol Authority.

Trotter, P. and Kearns, I. (1983). An Evaluation of the 'Bike Ed' Bicycle Safety Education Course - The Newcastle Study. Research Note 4/83. Traffic Accident Research Unit: Traffic Authority of New South Wales.

Turner, T. and McClure, L. (1975). Alcohol and Drug Use By Queensland School Children. Brisbane : Department of Education.

Valavuo, T. (1976). Cited by Rothengatter, J. (1981) op.cit.

van der Molen, HH. (1972). Cited by Rothengatter, J. (1981) op.cit.

van der Molen, HH. (1981). Child Pedestrian's Exposure, Accidents and Behaviour. Accident Analysis and Prevention, 13, 3, 193-224.

van der Molen, HH, Rothengatter, J.A. and Vinje, MP. (1981). Blueprint of an Analysis of the Pedestrian's Task - 1. Accident Analysis and Prevention, 13, 3, 175-191.

Van Houten, R., Malenfant, L. and Rolider, A. (1985). Increasing Driver Yielding and Pedestrian Signaling with Prompting, Feedback and Enforcement. Journal of Applied Behaviour Analysis, 18, 2, 103-110.

- Vernon, MD. (1962). The Psychology of Perception. Harmondsworth, Middlesex: Penguin.
- Vinje, MP. (1981). Children as Pedestrians: Abilities and Limitations. Accident Analysis and Prevention, 13, 3, 241-253.
- Webb, C.R., Bowman, J.R., and Sanson-Fisher, R.W. (unpubl.) Studies of Child Safety Restraint Use in Motor Vehicles - Some Methodological Considerations. Faculty of Medicine, University of Newcastle, NSW.
- Wells, P., Downing, C.S., and Bennett, M. (1979). Comparison of on-road and off-road Cycle Training for Children. Transport and Road Research Laboratory. TRRL Laboratory Report 902.
- Wittingslow, C.E. (1983). Investigation of Factors Significantly Affecting Child Seat Belt Usage. Accident Analysis and Prevention, 15, 4, 267-274.
- Wragg, J. (1984). Ideas for Drug and Alcohol Education for Students in Years 5-8. Personal Development Unit, Directorate of Special Programs, NSW. Department of Education.

APPENDICES

APPENDIX A

Federal Office of Road Safety Specification

SCHOOL ROAD SAFETY CURRICULA: REVIEW OF EXISTING PRACTICE AND DESIGN OF GUIDELINES

Background

The school system is considered to be a major avenue for promoting road safety in Australia. The reasons for this are obvious. Road crashes are the largest single cause of death for school age children, and the school system is one way of reaching most children. Support for school road safety education varies tremendously in terms of the availability of worthwhile programs and interest in its promotion. Yet little is known about what is taught in schools, how it is taught, the problems teachers have, and their expectations.

The task **of** designing school road safety materials is daunting. Unequivocal guidelines do not exist, though a body of knowledge has been built-up eg Rothengatter (1981). "Stand alone" programs aimed at specific behaviours such as pedestrian, cyclist, and driver skills have been devised by persons with a road safety orientation. Programs that are more integrated with the school curriculum have been devised by a wide range of people, including road safety and curriculum design specialists, and teachers.

The Federal Office of Road Safety is interested in promoting programmes that will have a significant impact on the relevant road safety behaviours of school children. In doing this, a program that is of interest to teachers and parents is required, as they are the ones who will have to implement it. Teachers vary in the extent that they prefer to be involved in the design of programs, so consideration needs to be given to achieving the same goal by different means. It is considered advantageous to take what is known about the effective design of road safety programmes and to combine it with the state-of-the-art of school curriculum design. The result is intended to be two sets of guidelines. One is to be used by those organizations that design and produce road safety programs for widespread dissemination. The other is to be used by schools to evaluate what is appropriate for their needs.

The Federal Office of Road Safety's interest in school road safety education is wideranging. It covers the child from pre-school to the end of high-school. Topics include: the stimulation of interest in road safety in children and school staff; the teaching of specific behaviour patterns, such as pedestrian skills: life-style choices, particularly for high-school students: and education of students to participate, as citizens, in community decisions about road

safety. This review is specifically not about driver training, because it relates to skills in the learning to drive process.

Programs aimed at road survival skills, such as those for cyclist and pedestrians, can be viewed as having two components, the focus of which varies with time. In the first instance, the focus is on restricting the child's exposure to the risk environment. One solution (not always practical) is to not teach skills for coping with risk, as their acquisition tends to be associated with increased exposure to the risk environment. As the child naturally gains greater exposure to risk, survival skills must be taught. Not only do these include knowledge about the environment and the skills necessary to cope with it, but also self-control and adaptation skills for monitoring the appropriateness of the child's own behaviour.

School-based road safety programs can function in at least three forms: school alone, school-parent interaction, and through special traffic schools. Guidelines for the first two types of programs will be required. Traffic schools will be addressed in a separate project.

Reference

Rothengatter, J.A. 1981. The influence of instructional variables on the effectiveness of traffic education. Accident Analysis and Prevention 13 (3) 241-253. ----- - - -

OBJECTIVES

1. To collate all major road safety programs that are used in Australian schools. These include all those developed and/or distributed by the states and road safety organizations.
2. To determine how widespread existing programmes are used in schools, and the quality with which they are taught.
3. To prepare two major sets of guidelines for the design of school road safety curricula.
 - a) The first should be for use by organizations that prepare school road safety materials for use with school-aged children. The guide should outline, and discuss, the steps necessary to: define the problem being attacked; identify strategies for coping with it; design, produce and validate the materials and procedures that make up the programme,

including the use of formative evaluation procedures: design, implementation and management systems, including discussion of the "scale effect": conduct pilot and summative evaluation procedures.

The guide should have an executive summary for use by non-technical persons, and a detailed body for use by the persons who will develop the programme.

- b) The second set of guides should be for use by school-staff. It should be an easy-to-follow, non-technical guide to the selection of road safety programmes for use in the schools. As well, it should give teachers advice on how to best integrate road safety materials into the normal school curricula.

The term "school" refers to pre, primary and secondary schools. A separate publication for each is required.

The guidelines should cover:

- a) programs that are used by the schools alone, and schools and parents working together.
 - b) the stimulation of interest in road safety for both school pupils and teachers,
 - c) stand alone programs and those that are integrated with the normal school curriculum. The appropriate role for each of these approaches should be specified,
 - d) reference material that program designers and users can refer to.
4. Prepare a report describing and commenting on the results obtained from the study.

Research required

1. Survey all relevant state and road safety organizations which produce and/or distribute road safety materials to determine what programs and materials are being propagated. In addition, what major plans do these organizations have for future production? Provide comment on these programmes.
2. Survey a sample of schools to determine what road safety activities occur in schools. It is suggested that a survey method that measures what happens over time may be more useful than a one-shot questionnaire.

3. **Observe teachers taking road safety programmes to determine the quality of teaching that exists. It is recognized that this can be expensive in terms of consultant effort and alternatives will be considered.**
4. **Survey teacher training institutions to determine how much preparation teacher trainees are given for teaching road safety in schools. As well, how interested would these institutions be in incorporating road safety into their curriculum, if relevant materials and information were made available.**
5. **In preparing the guidelines the contractor will be required to**
 - a) **Review the road safety education and training literature to identify key findings. The Federal Office of road Safety will be able to assist in gaining access to the literature.**
 - b) **Provide a state-of-the-art review of the design of school curricula, to the extent that it is relevant to the overall task.**
 - c) **Determine the types of programmes that schools prefer. This should go beyond an assessment of the types of current programmes available to schools. Consideration should also be given to how teachers would react to a variety of well-designed programmes.**
 - d) **Identify and review those techniques of changing behaviour that are suitable for use in**
 - (i) **learning and maintaining skills such as safe pedestrian and cycling behaviours and**
 - (ii) **making choices related to lifestyle decisions such as involvement in high-risk activities like drink-driving.**
 - e) **Identify how all the above can best be integrated.**

APPENDIX B

Survey of Developers

SCHOOL ROAD SAFETY RESEARCH PROJECT

SURVEY OF DEVELOPERS OF INFANT/PRIMARY SCHOOL ROAD SAFETY EDUCATION MATERIALS

The school system is considered to be a major avenue for promoting school road safety in Australia. The reasons for this are obvious. Road crashes are the largest single cause of death for school age children. Yet little is known about the development and dissemination of road safety materials for children in their first six or seven years of schooling.

There are no right or wrong answers to the survey. Please give information that will help us locate current practices, problems and needs. All information supplied by you will be treated confidentially. The surveys will be destroyed at the completion of the project.

SCHOOL ROAD SAFETY RESEARCH PROJECT

5 **State or Territory:** _____
 Name: _____ **Telephone:** _____
 Position Held: _____

Directions: Tick the appropriate box or write in the space provided.

1. Are you involved in developing, revising or adapting materials for school road safety for children up to 13 years of age, in any of the following areas:

6	(i)	Pedestrian safety	YES <input type="checkbox"/>
		NO <input type="checkbox"/>
7	(ii)	Bicycle safety	YES <input type="checkbox"/>
		NO <input type="checkbox"/>
8	(iii)	Restraint usage	YES <input type="checkbox"/>
		NO <input type="checkbox"/>
9	(iv)	Alcohol & safety	YES <input type="checkbox"/>
		NO <input type="checkbox"/>
	(v)	Others (please specify)	
		

2. Briefly state what materials you are currently developing, revising or adapting.

(i)	_____

(ii)	_____

(iii)	_____

(iv)	_____

Col #

3. When developing, revising or adapting materials for school road safety education, how did you begin?

(i) _____

(ii) _____

(iii) _____

(iv) _____

Others: _____

4. The following information might be useful to you when developing school road safety education material. (Please tick box if your answer is YES. If your answer is NO, leave blank.)

Information			Do you have sufficient of this information?	Do you use this information?	Would you like to have this information?
10-12	(i)	Information from road safety research	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13-15	(ii)	Statistical summary of road crashes	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16-18	(iii)	Copies of materials already in schools	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
19-21	(iv)	Critiques of materials already in schools	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
22-24	(v)	Reference lists of available material	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25-27	(vi)	Information about how children learn	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28-30	(vii)	Survey of road safety education needs as expressed by: Teachers	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
31-33	(viii)	Information about strategies and procedures which could be used when designing instructional materials so that children's behaviours will be changed.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34-36			<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Col #

5. If you were given guidelines to assist you in the development, revision or adaption of school road safety education materials what information, other than that listed in 4., would you like included?

6. How do you disseminate your materials to schools?

7. Who implements your materials in the schools?

8. How do you disseminate your materials to parents/community?

Survey of Teachers

SCHOOL ROAD SAFETY RESEARCH PROJECT

INFANT/PRIMARY TEACHER SURVEY

The school system is considered to be a major avenue for promoting road safety in Australia. The reasons for this are obvious. Road crashes are the largest single cause of death for school age children. Yet little is known about what is taught in schools, how it is taught, the problems teachers have and their expectations.

There are no right or wrong answers to the survey. Please give information that will help us locate current practices, problems and needs. All information supplied by you will be treated confidentially. The surveys will be destroyed at the completion of the project.

5

State or Territory: _____

School Name: _____ Telephone: _____

Teacher's Name: _____

6, 7

Grade Taught: _____

SCHOOL ROAD SAFETY RESEARCH PROJECT

Directions:
To answer the following questions please tick the appropriate box ☒ or write in the space provided. Some boxes have numbers within them e.g. ☐1 ☐2 ☐3 ☐4 . Ignore the numbers as they are for computer use only. Simply tick appropriate box e.g. ☐1 ☐ ☒3 ☐4 .

YOUR PRESENT ROAD SAFETY PROGRAM

1. Which of the following best describes your approach to teaching road safety?

Lesson Type

Frequency

occasionally
fairly frequently
very frequently

- 8
- (i) Planned lessons
- 9
- (ii) Incidental lessons
- ☐1 ☐2 ☐3
- ☐1 ☐2 ☐3

2. How is the teaching of road safety organised within your class?
You may tick more than one box.

- 10
- Incidentally, as specific needs/problems arise
- 11
- A "one off" lesson/visit/talk by a guest speaker
- 12
- As a separate program throughout the year
- 13
- As a skill development program outside the classroom
- 14
- As an integrated "theme" within another curriculum area
- 15
- As part of a broader health and safety education program
- 16
- Other (specify) _____
- _____
- _____

☐

☐

☐

☐

☐

☐

Col #

3. Indicate the use made of the following methods in your road safety teaching.

Please tick the appropriate box e.g. ☒ ☐ ☒ ☒

Method of Presentation

Road Safety Area

			PEDESTRIAN SAFETY	BICYCLE SAFETY	RESTRAINT USAGE	ALCOHOL & SAFETY
17-20	Visits to real traffic situations e.g. intersections, footpaths & busy roads.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21-24	Class/Group discussion using pamphlets, posters.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25-28	Teaching skills in a simulated traffic situation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29-32	Use of models/model making of traffic situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33-36	Teaching of slogans, e.g. "Click! Clack! Front and Back!"	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37-40	Safety songs, stories, poems	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41-44	Games based on road safety concepts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45-48	Role play - dramatisation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49-52	Road safety themes in other curriculum areas.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
53-56	Guest road safety speakers from the community eg. police.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57-60	Other: _____ _____ _____					

SUPPORT PEOPLE AND/OR MATERIALS YOU USE

4. To develop road safety awareness in children, do you use any of the following support areas?

61

a) Do you use a kit or program developed YES ☐
by an outside organisation? NO ☐

If YES, please list those used.

- (i) _____
- (ii) _____
- (iii) _____
- (iv) _____
- (v) _____

If NO, would you say why not?

b) Do you use other material developed by an outside organisation such as:

62

Books YES ☐
..... NO ☐

63

Booklets/leaflets YES ☐
..... NO ☐

64

Posters/wallcharts YES ☐
..... NO ☐

65

Films YES ☐
..... NO ☐

66

Videos YES ☐
..... NO ☐

67

Television programs YES ☐
..... NO ☐

68

Guidelines for selecting materials YES ☐
..... NO ☐

Col#

If YES, please list titles of those used.

- (i) _____
- (ii) _____
- (iii) _____
- (iv) _____
- (v) _____

If NO would you say why not?

69

- c) Do you use outside people and/or **YES** ☐
- organisations to come to your class..... **NO** ☐

If YES, tick the appropriate **box** to show which people and how often they come. (e.g. ☐ 1 ☐ 2 ☒ 3 ☐ 4)

People

Frequency

		weekly	monthly	termly	yearly
Police	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Other teachers in your school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Road Safety consultants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Department of Education consultants..	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Others - specify					

5. Has your school developed it's
curriculum for road safety?

YES

☐

NO

☐

If YES, what resources did you use?

(e.g. Police, consultants, kits, films etc.)

(i)

(ii)

(iii)

(iv)

(v)

If NO, what prevented you?

(i)

(ii)

(iii)

(iv)

(v)

PARENT INVOLVEMENT IN ROAD SAFETY EDUCATION

- 6) Does your school use programs that
encourage parental involvement in
teaching road safety?

YES

☐

NO

☐

If YES, state how you achieve this involvement.

(i)

(ii)

(iii)

(iv)

(v)

FUTURE PROGRAMMING FOR ROAD SAFETY EDUCATION

7. Do you feel you have sufficient support from people and/or materials to effectively develop road safety behaviours in the children you teach?
- YES ☐
- NO ☐

If **NO**, what additional support would you like to have to effectively teach road safety?

- (i) _____
- (ii) _____
- (iii) _____
- (iv) _____
- (v) _____

8. If the following materials were available to you, tick those that you would use.

Materials

81-84	Kits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
85-88	Programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
89-92	Books	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
93-96	Booklets/leaflets	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
97-100	Posters/wallcharts	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
101-104	Films	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
105-108	Videos	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
109-112	Television programs	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
113-116	Guidelines for selecting materials	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	for teaching road safety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Col. #

9. If the following people were available to you, tick those you would use.

People Road safety area

		PEDESTRIAN SAFETY	BICYCLE SAFETY	RESTRRAINT USAGE	ALCOHOL & SAFETY
117-120	Police	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
121-124	Road Safety consultants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
125-128	Department of Education consultants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
129-132	Parents	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
133-136	Other teachers in your school	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

10. Please add any other comments.

THANK YOU FOR COMPLETING THE SURVEY.



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(Inc NSW)

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F.A.I. Building,
619 Pacific Highway,
St. Leonards, 2065

Telephone (02) 438 1667

APPENDIX D

Covering Letter to Developers and Teachers TO THE PARTICIPANT

The Federal Office of Road Safety recently set up a School Road Safety Research Project. As the consultants for this project, we hope to achieve the following objectives:

- * Collate the major road safety programs, kits and materials currently being distributed or already in use in **Infants/Primary** schools around Australia.
- * Collate information on major projects currently under development.
- Determine the needs and problems associated with developing and implementing school road safety education materials.

In order to obtain realistic information about the development and implementation of road safety education materials, two surveys have been designed. One survey is for the developers of **Infants/Primary** school road safety education materials and the other for **Infants/Primary** teachers.

As a result of the investigation, two major sets of guidelines for school road safety education materials will then be produced. The first for use by organisations that prepare school road safety materials and the second for use by teachers in their selection and implementation of road safety materials. Your completion of the survey will be greatly appreciated.

Yours sincerely

Margaret Brown

Senior Research Associate

SCHOOL ROAD SAFETY RESEARCH PROJECT

(02)438 1667 (02)99 1452

ALEX MAGGS Ph D Principal Investigator
MARGARET BROWN B A Hons Senior Research Associate
BRUCE HEARN Administrator

Appendix E

Additional Information required to assist development, revision or adaptation of school road safety education materials.

State	Information Required
NT.	-
Qld. (R.S.A)	* Little scope for pure traffic education lessons - must be Integrated with curriculum subjects.
WA (D.E.)	<ul style="list-style-type: none"> * Samples of materials used in other countries. * Consultation with officers in C.A.E.'s and universities. * State contacts other than the obvious National Safety Council W.A. * Research on the effectiveness of existing programs (worldwide).
S.A. (D.E.)	<ul style="list-style-type: none"> * Data being used by teachers - compare format/ presentation of materials; compare promotion media/ strategies. * Psychology/sociology of the "average" teacher.
TAS.	-
ACT. (R.S.A.)	* Strategies for raising teachers and parents awareness of the road safety problem.

Appendix F

Methods for dissemination of road safety education materials to schools.

[illegible]

State	,Methods for dissemination of materials to schools.
TAS. (R.S.A.)	<ul style="list-style-type: none"> • Road safety officers disseminate materials.
A.C.T. (R.S.A.)	<ul style="list-style-type: none"> * On request • Advertised in newsletters, inservice courses, association meetings and senior teachers meetings.
NSW (R.S.A.) (D.E.)	<ul style="list-style-type: none"> • Through Department of Education to public, private and catholic schools. • Materials must be accepted by the Department of Education. * Inservice and promotion necessary. * Through Department of Education courier. * Via Health/P.E./Bike Education Consultants/ Co-ordinators in the regions of the state.
VIC. (R.S.A.)	<ul style="list-style-type: none"> * Past type used - Roadwork distributed to all primary schools in Victoria free of charge. Slide sets could be purchased - method not considered satisfactory as teachers either did not know about kit or could not use kit. • Present type - newsletters Sent to schools. Materials must be requested; Inservice programs; Consultancy visits to staff meetings or individual teacher D.E.C.A. - new materials introduced in conjunction with teachers visits to centre. A charge is made for materials.

(R.S.A.) = Traffic Authority Developers.

(D.E.)' = Department of Education Developers.

Appendix G

Dissemination of Materials to Parents and Community.

State	Dissemination Method.
NT. (R.S.A.)	<ul style="list-style-type: none"> * Displays, exhibitions, shows. * Tourist bureaus, community groups, libraries, child care centres, youth centres, hospitals, motor registry. * School councils by T.A. staff, police, teachers.
Qld. (R.S.A.)	<ul style="list-style-type: none"> * Through P & C, P & F associations. * Media release
W.A. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> * Direct from N.S.C. to community agencies * Through P & C; P & F associations. * Letters to parents from principals • Local newspapers * School based inservice - parent teacher evenings.
S.A. (R.S.A.)	<ul style="list-style-type: none"> * Newsletters * Media release * Promotions * Children complete worksheets at home.
TAS. (R.S.A.)	<ul style="list-style-type: none"> * Road safety officers invited to community support groups.
A.C.T. (R.S.A.)	<ul style="list-style-type: none"> * Letters to parents from principals. * Advertisements in school bulletin • Through P & C and school boards.

State	Dissemination Method.
NSW. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> • Through schools and children in schools. * Mass media. * Through representation on ACORSE committee. * Through community and non government organisations. • Through P & C. • Traffic Authority and media release.
VIC. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> • School councils, parent group meetings, local groups. * Through school - information sent home to parents. * Mass media * Through children to parents • Information sheets to schools for inclusion in newsletters.

(R.S.A.) = Traffic Authority Developers.

(D.E.) = Department of Education Developers.

ACORSE = The Advisory Committee On Road Safety Education.

Appendix H

Implementation of Materials in Primary Schools.

State	Personnel who Implement Materials.
N.T. (R.S.A.)	<ul style="list-style-type: none"> • Field officers * Police * Teachers.
Qld. (R.S.A.)	<ul style="list-style-type: none"> * Queensland Road Safety Council Officers • Teachers.
W.A. (R.S.A.) (D.E.)	<ul style="list-style-type: none"> * Individual teachers motivated/interested. * Advisors - limited number. * Principals * Superintendents (hopefully !!) * Teachers
S.A. (R.S.A.)	<ul style="list-style-type: none"> * Teachers with assistance from <ul style="list-style-type: none"> - key teachers - regional advisors (if motivated!!) - principals.
TAS. (R.S.A.)	<ul style="list-style-type: none"> * Road safety officers * Teachers.
A.C.T. (R.S.A.)	<ul style="list-style-type: none"> * Teachers * Parents

State	Personnel who Implement Materlals.
N.S.W. (R.S.A.) (D.E.)	<ul style="list-style-type: none">• Teachers* Consultants at inservice courses• Teachers• Teachers inservice in bicycle education* Consultants.
VIC. (R.S.A.)	<ul style="list-style-type: none">* Teachers who are interested.• Teachers and/or parents inservice in Bike education.* Consultants.

(R.S.A.) = Traffic Authority Developers.

(D.E.) = Department of Education Developers,

APPENDIX I

Advantages and Disadvantages of School- Based Curriculum Development

WHY HAVE SCHOOL-BASED CURRICULUM DEVELOPMENT?

Some advantages and disadvantages of school-based curriculum development are listed by Carlin, Purchall and Robinson (1976). These authors appear to use the term "school-based curriculum development" in its more literal sense. Their arguments apply equally in the case of the qualified meaning used in this article. They see school-based curriculum as possessing the following advantages:

1. Schools vary so much that the members of staff of a school are in the best position to determine the optimum use that can be made of that school's particular resources and Leacher expertise.
2. The needs and interests of children vary and the school is best placed to perceive these and to cater for them.
3. The people actually implementing the curriculum are those who have devised it. Thus the gap between theory and practice is narrowed. Further, the participants should be fully committed to the decisions taken.
4. The relatively small scope of the decisions being made makes the introduction of new ideas more feasible.
5. It becomes easier to involve parents and community leaders meaningfully in curriculum planning.

Carlin, Purchall and Robinson also see certain problems associated with school-based curriculum:-

1. Teaching staff have had little experience or training in the process involved.
 2. There is very little theoretical knowledge and no useful model available to assist schools in the process.
 3. The way that schools are organised at the moment means that teachers do not have the time to devote much effort to the process of curriculum planning.
 4. In most schools, there is little communication about curriculum matters between teachers, between the teachers and the community, and between teachers and the students.
 5. The school-based curriculum will entail substantial changes in the social roles of the inspector, the principals, and the teachers. Role changes are among the most difficult to bring about.
 6. There is a danger that schools will feel a pressure to become quickly involved in the process and decisions will be made too hastily.
-

APPENDIX J

ROADSWORK OBJECTIVES

- A. Familiarity with elements of the traffic environment
- B. Development of specific concepts related to the traffic environment
- C. Specific crossing objectives
 - 1. Uncontrolled crossings
 - 2. Controlled crossings
 - * Supervised School Crossing
 - * Pedestrian operated crossing

Students should be familiar with the following elements of the traffic environment:

- I Footpath
- II Pedestrian
- III Road
- IV Kerb
- V Vehicle
- VI Driver
- VII Passenger
- VIII Seatbelt/child restraint
- IX Indicator
- X Reversing lights/beeper
- XI Traffic
- XII Intersection
- XIII Corner
- XIV Traffic lights
- XV Traffic signs
- XVI Traffic markings
- XVII School crossing
- XVIII Pedestrian crossing
- XIX Railway crossing
- XX Pedestrian over/underpass
- XXI Traffic island/median strip
- XXII Obstacles
- XXIII Bend/curve, hill/crest
- XXIV Driveway

I FOOTPATHS

1. Recognize and name footpaths
2. Be aware of the characteristics of the footpath area
3. Be aware of correct and responsible use of the footpath
4. Know that where a road has a footpath on one side only, it should be used where present
5. Know that where there is **no** footpath, they should walk in single file as near to the edge as possible, facing oncoming traffic
6. Know that footpaths are unsafe playing areas in both busy and quiet streets
7. Recognize footpath users, e.g. pedestrians, prams, tricycles, cars coming through driveways

II PEDESTRIAN

1. Recognize and name pedestrians
2. Define pedestrians as someone who is standing, walking or running on the footpath or crossing the road
3. Explain the special problems a pedestrian presents to the driver of a vehicle
4. Be aware of correct pedestrian behaviour e.g. keeping to the left

III ROAD

1. Recognize and name a road
2. Recognize and identify the uses of different types of roads e.g. freeway/highway, country road, peak/off-peak city streets, busy/quiet suburban streets
3. Recognize differences in road surfaces and where they could be found e.g. dust/dirt, bitumen, gravel (screenings)
4. Recognize and name different road users e.g. cars, buses, cyclists, pedestrians

IV KERB

1. Recognize and name a kerb
2. Identify a person standing "at the kerb"
3. Demonstrate how they/a person would "stop at the kerb"

V VEHICLE

1. Recognize and name different types of vehicles
2. Identify safe and dangerous features of vehicles

VI DRIVER

1. Recognize and name drivers

VII PASSENGER

1. Recognize and name passengers
2. Define passengers as any occupant of a vehicle other than the driver
3. Be aware of correct passenger behaviour e.g. not to distract the driver, make too much noise, put their body outside the windows, play with door handles, leave the car before an adult's signal, enter/leave the car from the wrong side and remembering to put on their seatbelt

VIII SEATBELT/CHILD RESTRAINT

1. Recognize and identify seatbelts
2. Be aware that all occupants of a vehicle must be correctly restrained
3. Explain and demonstrate the importance of restraints in vehicles

IX INDICATOR

1. Recognize and name indicators
2. Recognize why vehicles are equipped with indicators
3. Predict the path that moving vehicles with/without indicators would be likely to take (turn left, turn right, go straight)
4. Recognize that the meaning ascribed to flashing indicators can vary in different situations:
 - e.g. right-hand side indicator
 - parked car about to pull out onto road
 - moving car about to turn right
 - moving car about to change lanes
 - e.g. left-hand side indicator
 - * moving car about to turn left
 - moving car about to pull over/park
 - * moving car about to change lanes
 - e.g. both indicators flashing
 - * car parked at the roadside
 - * emergency signal

X REVERSING LIGHTS/BEEPER

1. Recognize and name the white lights on the rear of a vehicle (reversing lights)
2. Predict the subsequent motion of a vehicle with its reversing lights on
3. Recognize that walking behind a vehicle when the driver is in it is a potentially dangerous situation
4. Recognize the "beeping sound" from a truck as indicating that it is reversing

XI TRAFFIC

1. Recognize and name traffic
2. Define traffic as vehicles on the road, including those stopped-at signals but excluding those that are parked
3. Identify both traffic and non-traffic components of the total road environment
4. Be aware of the traffic system

XII INTERSECTION

1. Recognize and name an intersection
2. Define an intersection as places where two or more roads meet
3. Recognize and name different types of intersections e.g. "T", roundabout, 5-ways
4. Recognize that intersections are more dangerous (for pedestrians) because cars are coming from many directions
5. Identify the different directions traffic could come from at an intersection
6. Recognize uncontrolled intersections as unsafe sites for crossing the road

XIII CORNER

1. Identify and name the corner of a street
2. Identify the directions from which traffic could come from and pass a person who is standing on the corner at an intersection

XIV TRAFFIC LIGHTS

1. Identify and name traffic lights
2. Identify the different colour stages of a traffic light and detail correct pedestrian responses to them

XV TRAFFIC SIGNS

1. Identify and ~~name~~ major traffic signs
2. Explain the meaning of these signs and detail correct pedestrian reactions to ~~them~~
3. 'Understand ~~why~~ traffic signs have particular shapes and colours"

XVI ROAD MARKINGS

1. Identify and name major road markings
2. Identify and match road markings and road signs
3. Recognize road markings at controlled crossings and detail correct pedestrian responses to ~~them~~ e.g. to walk within the lines

XVII SCHOOL CROSSING

1. Identify and name school crossings
2. Recognize that a school crossing is inoperative when no flags are displayed
3. Detail the role of the supervisor including the whistle sequence
4. Detail correct pedestrian responses to the supervisor's signal
5. Recognize the need to use their general crossing procedure on controlled crossings, even ~~when~~ the supervisor is present
6. Demonstrate correct pedestrian behaviour on a school crossing

XVIII PEDESTRIAN CROSSING

1. Identify and ~~name~~ a pedestrian crossing
2. Recognize that pedestrians should ensure that all vehicles have stopped before they step onto the road
3. Recognize the need to use their general crossing procedure ~~when~~ using a controlled crossing
4. Recognize that controlled crossings should be used where present

XIX RAILWAY CROSSING

1. Recognize ~~and~~ name a railway crossing
2. Recognize the various. visual and auditory signs that would indicate the presence of a railway crossing e.g. boom gates, flashing lights
3. Recognize that it is not safe to cross a railway crossing until all signals have stopped, not just when the train goes past
4. Detail/demonstrate correct pedestrian responses to a railway crossing

XX PEDESTRIAN OVER/UNDERPASS

- 1. Recognize and ~~name~~ a pedestrian over/underpass**
- 2. Recognize over/underpasses as safe places to cross the road, which should be used ~~when~~ present**
- 3. Be aware of the danger of molestation**

XXI TRAFFIC ISLAND/MEDIAN STRIP

- 1. Recognize and ~~name~~ the median strip on a road**
- 2. Explain the function or purpose of the median strip for pedestrians and drivers**
- 3. Know the differences between a divided road and quieter roads**
- 4. Detail/demonstrate ~~how~~ to correctly cross a divided road**

XXII OBSTACLES

- 1. Identify obstacles/hazards on the footpath**
- 2. Recognize that obstacles on the footpath can be dangerous as they may force pedestrians out onto the road**
- 3. ~~Know~~ that obstacles on the footpath should be passed on the inner side; or if one needs to venture out onto the road the kerbside drill should be employed**

XXIII BEND/CURVE, HILL/CREST

- 1. Recognize that crossing near a bend in the road or the crest of a hill is unsafe**
- 2. Explain ~~why~~ the above sites are unsafe for crossing the road i.e. they cannot see approaching vehicles and the drivers of approaching vehicles cannot see ~~them~~**

XXIV DRIVEWAY

- 1. Recognize and ~~name~~ a driveway**
- 2. Recognize that cars entering and leaving driveways could be hazardous for pedestrians using the footpath**
- 3. Recognize that the drivers of vehicles reversing out of driveways are unable to see pedestrians on the footpath**

Awareness of the traffic environment through the development of the following concepts.

- I Safe - unsafe/dangerous**
- II Safe safer safest**
- III Busy - quiet**
- IV Fast - slow**
- V Far - near**
- VI Noisy - quiet**
- VII Wide - narrow**
- VIII Straight route - indirect route**
- IX Approaching - departing**
- X Right - left**
- XI Right hand side - left hand side**
- XII Straight - turning**
- XIII Moving - stationary/parked**
- XIV Concentrate**
- XV Clear of traffic**
- XVI Clear view - blindspot**
- XVII Visibility - being able to see. being seen**
- XVIII Braking, stopping distance - speed**
- XIX Anticipate, what will happen next?**
- XX Dart out**
- XXI Courtesy, consideration**
- XXII Sounds, colours**
- XXIII Direction**
- XXIV Wait**
- XXV Accident**
- XXVI Rules**