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TEAM TRAINING FOR SAFER YOUNG DRIVERS AND PASSENGERS IN THE ACT:

A ROLE FOR CREW RESOURCE MANAGEMENT

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by

Eve Mitsopoulos
Michael Regan
Janet Anderson
Paul Salmon
Jessica Edquist

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Team Training for Safer Young Drivers and Passengers in the ACT: A Role for Crew Resource Management

Authors

Mitsopoulos, E., Regan, M. A., Anderson, J., Salmon, P. M., & Edquist, J.

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Abstract

Research has indicated that, depending upon driver and passenger characteristics, passengers can have either a positive or negative influence upon driver behaviour. In conclusion to a recent study investigating the roles that passengers can play to influence, positively and negatively, driver behaviour, Regan and Mitsopoulos (2001) recommended, among other things, that the principles of Crew Resource Management (CRM) training may increase passengers' ability to positively influence driver behaviour and also drivers' ability to accept constructive feedback. The present study investigated the potential application of CRM training within young driver training in the Australian Capital Territory (ACT). This involved a literature review, an analysis of the differences between the driving and aviation domains, an analysis of the team-based activities and the knowledge, skills and attitudes required during driving to perform those activities, consultation with CRM experts from the aviation and medicine domains and the conduct of six focus groups involving young learner drivers, provisional licence drivers and course teachers. The findings indicate that CRM training as part of young driver training in the ACT is a viable concept to pursue. The application of CRM training within young driver training has potential to significantly enhance the positive and reduce the negative effects of passengers on young driver behaviour, and thus the safety of young drivers and passengers alike. The outcomes of this study formed the basis for a set of recommendations for the development of a young driver CRM training program in the ACT.

Key Words

Young drivers, passengers, driver behaviour, training, Crew Resource Management, teams, road safety

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Monash University Accident Research Centre, Wellington Road, Clayton, Victoria, 3800, Australia. Telephone: +61 3 9905 4371, Fax: +61 3 9905 4363

Preface

Project Manager

- Dr Michael Regan

Research Team

(in alphabetical order)

- Dr Janet Anderson
- Ms Jessica Edquist
- Ms Eve Mitsopoulos
- Mr Paul Salmon

Correspondence

Please direct all correspondence to:

Dr Michael Regan
Monash University Accident Research Centre
Building 70
MONASH UNIVERSITY VIC 3800

Telephone: +61 3 9905 1838
Facsimile: +61 3 9905 4363
E-mail: michael.regan@general.monash.edu.au

Disclaimer

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Contents

Tables

Executive Summary

Background and Overall Objective

Research into the effects of passengers on driving behaviour and crash risk has indicated that, depending upon driver and passenger characteristics, passengers can have either a positive or negative influence on driver behaviour. In conclusion to a study investigating the roles passengers play, positive and negative, to influence driver behaviour, Regan and Mitsopoulos (2001) recommended, among other things, that the principles of Crew Resource Management (CRM) training may increase passengers' ability to positively influence driver behaviour and also drivers' ability to accept constructive feedback. CRM training was originally developed in the aviation domain to enhance crew communication and coordination, and has since been applied in other domains, such as medicine, offshore oil and air traffic control in order to enhance team performance. However, there has been no research into the application of CRM training in the driving domain. To date the driver has been the sole recipient of training interventions in the car cockpit; that drivers and passengers operate as a team to enhance safety, and that training has the potential to enhance teamwork has not been previously recognised in road safety.

The NRMA-ACT Road Safety Trust commissioned the Monash University Accident Research Centre (MUARC) to investigate the potential application of CRM training within young driver training in the Australian Capital Territory (ACT). This study was partitioned into five phases: a review of the recent literature on the influences of passengers on young driver crash risk and behaviour, young driver training approaches, and the relevant literature on CRM training; an analysis of current young driver training in the ACT; an investigation into potential CRM applications in young driver training in the ACT; the conduct of focus groups designed to assess perceptions towards CRM training in young driver training and the application of CRM in driving; and the development of recommendations for a young driver CRM training program in the ACT. The purpose of this report is to describe the research conducted and to present the findings from each phase identified above.

Literature Review

The purpose of the literature review was to determine how CRM training is currently conducted, establish how effective CRM training applications have been, and investigate CRM training applications across different domains. An additional aim of the literature review was to briefly investigate the recent literature on the influences of passengers on young driver crash risk and behaviour, and also the literature on young driver training programs.

Young Drivers and the Influence of Passengers on Young Driver Behaviour

The literature indicated that, when compared to other age groups, young drivers have a high risk of being involved in road crashes and injuries, and that they are more likely to be involved in single vehicle crashes, in crashes on curves, in crashes at night, and in crashes involving excessive

speed. This increased risk to young drivers is attributable to a number of factors, including lack of driving experience and poorly developed driving skills, psychological factors such as impulsiveness, deliberate risk taking and sensation seeking, unsafe driving behaviour (e.g. speeding, close following) and over-estimation of their driving ability and under-estimation of the risks involved in driving. Research into the effects of the presence of passengers on driver behaviour indicates that passengers can have a positive or negative influence on driver behaviour depending on the characteristics of the passengers and the driver (e.g. age, gender).

Young Driver Training

According to the literature, there are three types of training approaches for young drivers: the traditional, the insight, and the cognitive-perceptual skills approach. Traditional driver training programs tend to focus on developing vehicle-handling and control skills and knowledge of the road and traffic laws. Most of the training takes place in the vehicle and, depending on the jurisdiction, may also include the training of skills to be used in emergency situations. Insight-oriented training programs focus on the development of higher-order attitudinal-motivational skills critical for safe driving. The aim of the insight approach is to increase drivers' awareness of the risks that contribute to road trauma, including limitations in driving skills and underestimation of risk. In doing so, the intent is to guard against the development of overconfidence and overestimation of skills, which are typically a by-product of more traditional training approaches. Finally, cognitive-perceptual skills training aims to impart higher order cognitive skills, such as information processing capacity, situation awareness, attentional control and hazard perception.

Crew Resource Management (CRM)

CRM is a collection of training methods designed to develop competencies in teamwork and performance. CRM training programs were originally developed in response to analyses of aviation crash data showing that many crashes were caused, not by lack of technical proficiency, but by lack of co-ordination among team members or under utilisation of team members' resources. The first CRM training program was implemented by a United States (US) airline in 1981, and since then CRM training programs have evolved through five distinct generations. The latest generation emphasises the management of error, and bases its training on the notion that error is an inevitable feature of crew performance. CRM training programs are delivered using four general strategies: information, demonstration, practice and feedback. Methods commonly used for the delivery of CRM training include lectures, group discussions, video demonstrations, role-plays, simulations and observer training. The effectiveness of CRM training interventions has been investigated in a number of different ways, including the assessment of trainee reactions and attitudes towards CRM, behavioural evaluations, simulator studies, experimental evaluations, and field evaluations.

Despite their origin within the aviation domain, the literature indicates that CRM training programs have been successfully applied in a number of additional domains, including offshore oil, medicine, helicopter rescue, air traffic control, maritime operations and the rail safety domain. Essentially, CRM training programs could potentially be applied in any domain where effective teamwork could serve to enhance safety.

Analysis of Young Driver Training in the ACT

In order to investigate the potential for incorporating CRM training into young driver training in the ACT, an analysis of the principal current young driver training program in the ACT was undertaken. The analysis involved reviewing relevant literature, namely course documentation and notes, teaching resources, and relevant websites. The main findings were as follows:

- Current young driver training in the ACT is delivered through the Road Ready program, which involves four components: the Pre-Learner module, the Road Ready classroom module, the Learner module and the Solo Driver module.
- A number of key CRM training principles are already covered within existing Road Ready modules, such as the identification of safe and unsafe driving, awareness of human performance and driver limitations, hazard recognition and management, the influences of peers and passengers, and risk analysis.
- A number of key CRM principles are not covered within current Road Ready modules, such as how to communicate effectively and appropriately, how the teamwork concept applies to driving and the benefits of teamwork, recognising situations in which teamwork could be utilised, assertiveness, passenger roles, and monitoring driver performance.
- Consideration should be given to the integration of CRM training within current Road Ready training modules, in particular, through the Road Ready classroom course and the Solo Driver Road Ready Plus course.

Investigating the Application of CRM in Young Driver Training

The next phase of the research involved investigating the potential content and delivery of CRM training applications within young driver training programs. This involved determining the key differences between the driving and aviation domains, identifying the team-based activities involved during driving and the knowledge, skills and attitudes (KSAs) required to perform these activities, and consultation with CRM experts from different domains. The main findings are summarised below.

Differences between Driving and Aviation Domains

There are a number of key differences between the driving and aviation domains that will significantly impact the content and delivery of a young driver CRM training program. Accordingly, these differences would need to be given due consideration in developing such a program. The differences identified between the two domains have the following implications for any driver CRM training program:

- Driver CRM training should emphasise the potential differences between drivers (such as skill levels and risk taking behaviour).
- Driver CRM training should emphasise the benefits associated with passenger monitoring of driver performance.

- Driver CRM training should include a component that highlights the importance of teamwork within the driving domain, including the benefits arising from effective teamwork in driving, such as road safety improvements.
- Driver CRM training should teach drivers and passengers to effectively recognise situations in which teamwork could be utilised.
- Driver CRM programs should develop skills for negotiating safe performance standards within driving teams.
- The benefits of driver CRM training will only be realised with recurrent training.
- The benefits of driver CRM training will only be fully realised if a significant proportion of the driving population receives the training.

Identification of the Knowledge, Skills and Attitudes (KSAs) Required to Perform Team-Based Driving Tasks

In order to identify the team-based activities involved during driving and the key KSAs required to perform the activities, the following tasks were undertaken:

1. A review of the aviation training literature was conducted in order to identify those KSAs trained in the aviation domain that relate to the driving task.
2. A review of the relevant young driver crash literature was carried out in order to identify any team-based factors that were implicated in young driver crashes which occurred in the presence of passengers.
3. On the basis of the two tasks above, an initial list of team-based activities and the KSAs required to perform them during the driving task was created.

The following set of key team-based activities involved during driving was identified:

- allocation of tasks between the driver and passengers;
- ensuring the driver is fit to drive;
- ensuring the driver drives safely; and
- ensuring hazards are detected and appropriate action is taken.

In turn, the KSAs required to perform these team-based activities were identified. This list of KSAs is presented in section 5.2 of the current report.

Consultation with Experts in CRM Training

Following consultation with CRM experts, it was concluded that the main emphasis of young driver CRM training should be upon the communication skills required to achieve the following three critical tasks:

- ensuring the driver is fit to drive;
- ensuring the driver drives safely; and
- ensuring hazards are detected and appropriate action is taken.

Further, the following potential techniques for the delivery of young driver CRM training were identified:

- CRM-related skills lectures;
- role-plays involving specific CRM skills related strategy scenarios;
- video demonstrations of CRM related strategies followed by group discussion; and
- video games which can only be won if players work as a team.

Focus Groups

Six focus groups were held in the ACT involving a total of 39 participants. Four different groups were used for the focus groups: young pre-learner/learner drivers who were currently undertaking, or who had completed within the preceding year, the Road Ready classroom course, young drivers who had completed the Road Ready Plus course, teachers of the Road Ready classroom program delivered in ACT High Schools, and facilitators of the Road Ready Plus program. The main aims of the focus groups were as follows:

- to examine whether young drivers and passengers report experiences indicative of a need for team training;
- to assess young driver perceptions of team training in communication in the driving domain; and
- to assess perceptions of and reactions towards the proposed CRM training delivery methods.

The main findings consisted of the following:

- participants were positive towards the concept of team training within the driving domain;
- sections of the Road Ready classroom and Road Ready Plus programs could be extended to explore the theme of communication between drivers and passengers;
- practical interactive activities would be the most suitable CRM training delivery method;
- participants need to be able to easily connect the activity to their behaviour in the car;
- due to their lack of real-world driving experience, pre-learner participants would require demonstrative CRM training activities rather than imaginative activities; and
- Road Ready Plus CRM training could involve activities focusing upon participants' previous driving experiences.

Recommendations for Incorporating CRM Training into Current Young Driver Training in the ACT

Based upon the findings of the research conducted for this study, recommendations for incorporating CRM training into current young driver training in the ACT were developed. To assist in this process, the authors convened a small workshop involving a group of CRM and young driver training subject matter experts (SMEs). A summary of the recommendations is given below:

1. CRM training in young driver training is an appropriate concept to pursue. The application of CRM training within young driver training has potential to significantly enhance the positive and reduce the negative effects of passengers on young driver behaviour and, therefore, young driver and passenger safety.
2. CRM training should be offered as part of young driver training in the ACT, with an emphasis at first on the skills that are most likely to have a big impact on safety.
3. The key features of CRM training, which ensure its effectiveness, are practice and feedback. It is vital that these aspects of the program are incorporated into any young driver CRM training program because a theoretical understanding of the skills alone is not sufficient to ensure behaviour change.
4. The driver CRM training program should have a clear focus on road safety, with an emphasis on modifying behavior for a safer outcome.
5. The driver CRM training program should cater for the differences between the driving and aviation domains. In particular, the driver CRM training program should emphasise the potential differences between drivers, the benefits arising from passenger monitoring of driver performance, the importance of teamwork, the benefits arising from passengers and drivers working effectively as a team, and the potential road safety improvements resulting from effective teamwork in driving.
6. Emphasis should be placed on clearly explaining passenger influences on the driver, how the teamwork concept applies to driving, when teamwork could be utilised, and the skills necessary for drivers and passengers to act as an effective team.
7. The component of CRM that would appear initially to be most useful for young drivers and passengers is effective communication, and this is covered only tangentially in current young driver training in the ACT. The young driver CRM training program should therefore focus on the training and development of effective communication skills.
8. The scenarios for training communication skills should be derived from three key team-based activities:
   - ensuring the driver is fit to drive;
   - ensuring the driver is driving safely; and
   - ensuring hazards are perceived and corrective action is taken.
9. The "support process" is an example of a communication strategy that could be included within young driver CRM training. This technique is used in the aviation domain and is designed to address problems before safety becomes compromised. The authors recommend that investigations be made into the adaptation of the "support process" technique and other appropriate communication strategies for use in the driving domain.
10. Consideration should be given to integrating appropriate CRM training into current Road Ready modules. In particular, it was recommended that formal CRM training be integrated into the Road Ready classroom and Road Ready Plus courses and that, as part of a later iteration of the training development, consideration be given to use of the Learner module as a further avenue for CRM training. It is recognised, however, that there is currently limited space within the existing Road Ready classroom and Road Ready Plus courses and that, on a

practical level, the inclusion of CRM training may be difficult to achieve. While not usual practice in some domains in which CRM training is given, the potential for a stand-alone young driver CRM training course should not be prematurely discounted. As such, it is recommended that further investigation be conducted regarding the benefits and disbenefits of integrating CRM training within current young driver training in the ACT as opposed to the potential development of a stand alone CRM course. A combined approach offers a further option. This process may include the conduct of a needs analysis involving driver training and CRM training SMEs.

11. From a developmental viewpoint, the timing of young driver CRM training is crucial. Young driver CRM training interventions may be more likely to have a greater impact when delivered to students at a later stage of development. However, it is recommended that aspects of CRM should be implemented at the earliest stage possible. The following offers a potential timeline for CRM training implementation:

    - Junior and middle High School levels (years 7, 8 and 9). Raise awareness of the general importance of effective communication in certain situations and not necessarily in situations restricted to driving.
    - Senior High School and College levels (years 10, 11 and 12). Commence formal exposure to CRM principles in driving as part of the Road Ready classroom course, and through peer facilitation as part of the ACT "Mentoring Road Safety Kit". This involves Year 11 and 12 College students (who have received their Provisional Licence) preparing and delivering lessons on road safety to Year 10 students (who have not yet started to drive) that draw on their own experiences as novice drivers.
    - Road Ready Plus course. Provide formal CRM training as a pre-workshop activity with follow-up discussion at the workshop.

12. The delivery of young driver CRM training should make use of the following methods as appropriate:

    - lectures, incorporating group discussion;
    - role-plays;
    - video demonstrations followed by group discussion; and
    - video games which can only be won if all players work as a team.

13. There should be a meaningful incentive for young drivers to complete the CRM training. One possible incentive would be the award of one credit point towards students' Year 12 College certificate upon completion of the CRM training.

14. The amount of CRM training provided is also crucial. It is recommended that further investigation into the minimum level of CRM training required be conducted. As in recommendation 10, this might be achieved through the conduct of a needs analysis involving young driver training and CRM training SMEs.

Recommendations for Further Research

The current study also served to highlight the need for further research into CRM training applications in the driving domain:

- Further investigation into the timing, content, delivery and effects of CRM training on current young driver training in the ACT.
- The conduct of an exhaustive analysis of the team-based activities and the corresponding KSAs required during driving.
- The development of a pilot young driver CRM training program.
- The conduct of a pilot young driver CRM training program evaluation study.
- The development of a CRM skills assessment methodology.
- The conduct of a CRM skills assessment methodology validation study.
- The implementation of a young driver training CRM program within current young driver training in the ACT.
- The conduct of a driver CRM training program evaluation study.
- More generally, further research into the concept of team activity in the driving domain.

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Chapter 1 Introduction

1.1 Background

The aim of this research was to examine the potential for CRM training in young driver training in the ACT. Previous research has shown that young drivers' crash risk is increased when they carry passengers who are their age peers. CRM training has been effective in other industries in training teams to effectively coordinate their efforts and use all the resources available to them to enhance performance and optimise safety. Previous research, including that undertaken at MUARC (Regan & Mitsopoulos, 2001), has found that passengers do have an influence on young drivers and it was suggested that CRM training might encourage passengers to exert a positive, rather than negative, influence. However, the domains in which CRM has been applied vary in significant ways from the road transport domain and until now it was unclear how the training could be adapted for young drivers and passengers and how acceptable these techniques would be to them. The present research was undertaken to develop a preliminary idea of how to adapt CRM training for application in the driving domain, taking into account perceptions towards CRM training in young driver training and the application of CRM training in driving. To the knowledge of the authors, this line of work is the first to explore the role of training for both drivers and passengers, as a team. Historically, the focus of training in the road transport domain been on the driver only.

1.2 Research Activities

The research comprised five key phases. A summary of each phase is given below:

1. A review of the literature. A literature review was conducted to determine how CRM training is currently conducted, how effective it is and in what industries it has been used. The literature on the influences of passengers on young driver crash risk and behaviour and on training programs for young drivers was reviewed only briefly. More extensive reviews are readily available (for passenger influences on young drivers, see Regan & Mitsopoulos, 2001; for young driver training, see Senserrick & Morrison, 2003).
2. Analysis of current young driver training in the ACT. In order to identify potential areas for the application of CRM training within young driver training programs, a review of current young driver training in the ACT was conducted. The four components of the Road Ready program (Pre-learner, Road Ready classroom, Learner and Solo Driver Road Ready Plus modules) were considered based upon their content and also their potential for integration with CRM training principles.
3. Investigation of potential CRM training applications in young driver training. This component of the research was conducted in order to investigate the potential content and delivery of a young driver CRM training program. This phase comprised three main stages. Firstly, key differences between the driving and aviation domains were identified. Secondly, the key team-based activities required during the driving task and also the KSAs required to carry out those activities were identified. Thirdly, CRM training professionals from the aviation and medicine domains were consulted in order to develop an understanding of current CRM training

programs, the delivery techniques used in their respective domains and also to identify possible ways in which the techniques could be adapted for drivers.

4. Examination of young pre-driver/driver and trainer perceptions towards CRM training in young driver training and the potential CRM training delivery methods. Six focus groups were conducted with four groups: young pre-learner/learner drivers who were currently undertaking, or who had completed within the preceding year, the Road Ready classroom program, young drivers who had completed the Road Ready Plus course, teachers of the Road Ready classroom program delivered in ACT High Schools, and facilitators of the Road Ready Plus program. All groups completed a short questionnaire and then participated in a focus group discussion about the training.
5. Development of recommendations for incorporating CRM training into current young driver training in the ACT. A set of recommendations was developed based upon the findings from the previous research phases. It is intended that these recommendations will inform the development of a pilot young driver training CRM program in the ACT were it to go ahead.

This report describes the work conducted during each of the research phases identified above, and presents the key findings from each. The mini review of passenger influences on young driver crash risk and behaviour is presented in chapter 2. In chapter 3, the concept of CRM is introduced and the results of the literature review on CRM training are presented. The review and analysis of current young driver training in the ACT is presented in chapter 4, and the investigations into potential young driver CRM training programs are discussed in chapter 5. Chapter 6 summarises the findings of the focus groups. The recommendations for incorporating CRM training into current young driver training in the ACT are presented in chapter 7. Finally, the conclusions deriving from this research are presented in Chapter 8, including a summary of the key findings, and recommendations for further research in this area.

Chapter 2 Young Drivers

2.1 Introduction to Young Drivers

Compared to other age groups, young drivers have a high risk of being involved in road crashes and injuries (Triggs & Smith, 1996). They are more likely to be involved in single vehicle crashes, in crashes on curves, in crashes at night, and in crashes involving excessive speed (Macdonald, 1994). Their increased risk is likely to be attributable to a number of factors. These include the following:

- lack of experience and poorly developed driving skills;
- psychological factors such as impulsiveness, deliberate risk taking and sensation seeking;
- unsafe driving behaviour such as speeding, drinking, drug taking and close following; and
- over estimating their driving ability and under estimating the risks involved.

Young drivers are at a stage of life when they are developing their own independence and autonomy. Driving is therefore likely to serve psychological needs as well as providing transport mobility. The social motivations for young peoples' driving might be related to their increased safety risk (Gregersen & Berg, 1994).

2.2 Passenger Influences on Young Drivers

There is a large body of research investigating the effects of the presence of passengers on driving behaviour and crash risk. Passengers can have a positive or negative influence on driver behaviour depending on the characteristics of the passengers and the driver. For example, passengers generally have been shown to increase the risk of crashes for young drivers (Doherty, Andrey & MacGregor, 1998), but passengers have either no effect or a beneficial effect on older drivers (Preusser, Ferguson & Williams, 1998; Vollrath, Reiss & Krüger, 1997; Vollrath, Meilinger & Krüger, 2002; Rueda-Domingo et al., 2004).

The picture becomes more complex when the relative ages and genders of drivers and their passengers are taken into account. Young drivers carrying older passengers have a reduced crash risk (Doherty et al, 1998), especially if the passenger is a parent (Arnett, Offer & Fine, 1997). However, young passengers greatly increase the crash risk for young drivers (Chen, Baker, Braver & Li, 2000; Preusser et al., 1998). The crash risk for young drivers carrying passengers is higher for male drivers than for female drivers, and male passengers increase the crash risk for both male and female drivers (Chen et al., 2000).

Although some studies have suggested that the detrimental effect of passengers arises because they distract the driver's attention from the driving task (Vollrath et al., 2002), other studies have begun to examine the effect of social influences that arise from interactions between passengers and drivers. Rolls, Hall, Ingham and McDonald (1991) used interviews and self-report data to demonstrate that peer pressure from young male passengers encouraged young drivers to engage in risk taking behaviour. In contrast, carrying older passengers, especially parents, induced young

drivers to drive more carefully because they were motivated by a desire to demonstrate their ability to drive safely and responsibly.

In a comprehensive questionnaire and focus group study of how passengers influence young drivers, Regan and Mitsopoulos (2001) found that passengers could play a number of roles as co-pilots of the vehicle. Drivers reported that passengers could assist drivers by navigating, operating in-vehicle devices such as the radio, interacting with the driver to relieve boredom and maintain alertness, warning of hazards and monitoring speed. However, it was also noted that passengers could also provoke anti-social driving behaviour, such as abusing other drivers, and risk taking behaviour such as speeding. This could occur implicitly through the mere presence of the passenger, or explicitly through verbal communication.

Young male passengers were more likely to influence young drivers of both genders to engage in anti-social and risk-taking behaviour, especially with young male drivers. Young male passengers reported being very reluctant to request a young male driver to drive safely even if they were concerned about safety. Passengers who exerted a positive influence on drivers were older people, the driver's parents and children. Drivers reported a heightened sense of responsibility and a desire to exhibit their safe driving skills with these passengers.

Interestingly, drivers did not universally appreciate the positive roles played by passengers. Drivers felt that the positive roles identified could be annoying if passengers were continually intervening or warning about every possible hazard. Some drivers also reported that their attention was distracted from driving by monitoring the passengers' actions.

A recent study conducted in Norway also examined interactions between young drivers and passengers. Ulleberg (2004) surveyed Norwegian teenagers with the aim of identifying the factors that influenced whether they would request an unsafe driver to drive more safely. Females were more willing to communicate their discomfort with risky driving than males. Males reported more possible negative consequences from confronting unsafe drivers, were less confident about their ability to influence the driver's behaviour, were more likely to accept risky driving and perceived less risk than females. Despite these factors, males reported higher levels of stress when driving with an unsafe driver, reinforcing the interpretation that their reluctance to speak out is based on fear of negative social consequences.

2.3 Countermeasures for Young Driver/Passenger Problems

Only a few studies have investigated behavioural countermeasures that might address the problem of negative passenger influence on young drivers. A number of studies have demonstrated that verbal feedback to drivers can assist in reducing driving errors. For example, Hutton, Sibley, Harper and Hunt (2002) trained passengers to deliver non-evaluative feedback to two drivers on two driving errors. Information feedback was given whenever an error occurred and resulted in a reduction in error rates. However, the interactions between young drivers and their passengers are considerably more subtle and complex than the driving behaviour addressed in that study.

Regan and Mitsopoulos (2001) recommended, among other things, that the principles of CRM training might be beneficial in addressing some of these problems. The rationale for this suggestion is that passengers already influence young drivers, sometimes in negative ways, and that training might increase the passenger's ability to *positively* influence drivers and the drivers'

ability to accept constructive feedback. This implies that drivers and passengers should act as a team, sharing responsibility for safety. Regan and Mitsopoulos are the first to have suggested that training should focus not just on the driver, but also on the driver and passenger(s) as a team.

CRM training was originally developed in the aviation domain to enhance crew communication and co-ordination. Since that time the practice of CRM itself has undergone considerable development. Although it was not clear at the commencement of the study how CRM training might be adapted to driver training, it has been adapted for use in domains outside aviation, including medicine and air traffic control. A review of the CRM literature was conducted to identify common components of aviation CRM training and how it has been adapted for use in other domains. This review is presented in Chapter 3. First, an overview of current young driver training approaches is provided.

2.4 Young Driver Training

Driving is a highly complex skill that involves many different components, including vehicle control skills and perceptual and cognitive skills. In their review of the effectiveness of driver training for young, inexperienced drivers, Senserrick and Morrison (2003) compared and contrasted three types of driver training approaches for young drivers: the traditional, the insight, and the cognitive-perceptual skills approach. Traditional driver training programs tend to focus on developing vehicle-handling and control skills and knowledge of the road and traffic laws. Most of the training takes place in the vehicle and, depending on the jurisdiction, may also include the training of skills to be used in emergency situations. This type of training for learner drivers is successful in training them to operate a vehicle in traffic, in passing practical driving tests, and in preventing crashes during the learner period (Senserrick & Morrison, 2003). Unfortunately, these traditional programs in and of themselves have been found to be generally ineffective in reducing crashes post-licensure (Christie, 2001).

The second type of training is insight-oriented training. These programs focus on the development of higher-order attitudinal-motivational skills critical for safe driving. The aim of the insight approach is to increase drivers' awareness of the risks that contribute to road trauma, including limitations in driving skills and underestimation of risk (Senserrick & Morrison, 2003). In doing so, the intent is to guard against the development of overconfidence and overestimation of skills, which are typically a by-product of more traditional training approaches. It has been found that increased awareness of risks reduces over-confidence and risk taking behaviour in young drivers and young male drivers in particular (Senserrick & Swinburne, 2001). In addition, Carstensen (2002) found that young people who had received insight training had fewer crashes than young people who had not received the training.

Finally, cognitive-perceptual skills training aims to impart higher order cognitive skills, such as situation awareness, attentional control and hazard perception. Within this approach to driver training the area that has received the most attention is hazard perception. Hazard perception is a complex skill that involves scanning the environment, perceiving other road users and predicting their future position (Ferguson, 2003). Quimby, Maycock, Carter, Dixon and Wall, (1986) found that this ability was related to crash frequency: slower perception of hazards was related to higher crash frequency. Simulator studies have shown that hazard perception training significantly increases safe driving performance in young drivers (Regan, Triggs & Godley, 2000; Fisher et al., 2002).

The insight and cognitive-perceptual approaches to driver training concentrate on developing higher order cognitive skills and these skills are crucial to reducing the higher crash risk of young drivers (Senserrick & Morrison, 2003). Hatakka, Keskinen, Gregersen, Glad and Hernetkoski (2002) have developed a method of classifying the skills required for driving, using a hierarchy with four levels. At the lowest level of the hierarchy is vehicle manoeuvring skill. The second level involves mastery of traffic situations. The third level relates to identifying the driving goals that influence personal decisions and the context of driving, including developing an awareness of how social pressure influences driving. The highest level is called "life skills" and aims to develop an awareness of how life goals and personal tendencies relate to driving behaviour and how driving can fulfil self-enhancement needs. Training at this level emphasises self-evaluation and impulse control.

CRM training can also be classified at the highest level of the matrix. The ability to communicate assertively and effectively in the service of personal safety is a critical life skill. CRM training also develops the ability to make independent judgments and resist social pressure and influences. These are skills that could enhance safety in other areas of life as well as in driving.

Chapter 3 Review of the Literature on Crew Resource Management Training

3.1 Introduction to Crew Resource Management

CRM training programs were developed in response to analyses of aviation accident data showing that many accidents were caused, not by lack of technical proficiency, but by lack of co-ordination among team members or under utilization of team members' resources (Salas, Prince, et al., 1999). Commonly identified problems included lack of assertiveness by junior crewmembers and authoritarian attitudes on the part of captains (Helmreich, Merritt & Wilhelm, 1999). In some cases these behaviours led directly to accidents when junior crewmembers were not able to draw attention to evolving problems. CRM was developed to ensure that all available resources were used to solve problems and ensure safety. Ongoing training underwent a shift in emphasis from the individual to the team, which was a major innovation (Salas, Prince, et al., 1999).

3.2 Definition of CRM, CRM Training and of Teams

CRM is formally defined as "using all available resources – information, equipment and people – to achieve safe and efficient flight operations" (Lauber, 1984). According to Helmreich and Foushee (1993) CRM includes "optimising not only the person-machine interface and the acquisition of timely, appropriate information, but also interpersonal activities including leadership, effective team formation and maintenance, problem solving, decision making and maintaining situation awareness" (p.4). Salas, Prince, et al (1999) define CRM as "a set of teamwork competencies that allow the crew to cope with the situational demands that would overwhelm any individual crew member". In a broader sense, CRM can be defined as a collection of training methods that aim to develop particular competencies in cockpit teamwork and performance using well tested tools and methods (Salas, Rhodenizer & Bowers, 2000). Inherent within CRM programs is a focus upon enhancing the skills required for collaborative activity or 'teamwork' in order to improve performance. Consequently, before discussing CRM applications, it is first necessary to understand the concept of teamwork.

According to Savoie (1998, cited in Salas, 2004) the use of teams has risen dramatically over the past three decades, with reports of 'team presence' by workers rising from 5% in 1980 to 50% in the mid 1990s. Cooke (2004) suggests that greater task complexity resulting from an increase in the use of technology has led to an increased requirement for teamwork. Most definitions of teams emphasise the notion of co-operative action (Stout, Salas & Fowlkes, 1997). For example, Morgan, Glickman, Woodard, Blaiwes and Salas (1986) defined a team as a set of two or more people who interact to achieve shared objectives. Another definition sees a team as a "group of workers who have complementary skills and a common set of performance goals and standards and who act with mutual responsibility and accountability" (Katzenback & Smith, cited in Seamster & Kaempf, 2001, p.14).

Other definitions introduce the concept of the team adapting to changing circumstances. McIntyre and Salas (1995) defined a team as a group of people interacting toward common goals and adapting to changing circumstances. Again, a team is "two or more people who interact…

dynamically and adaptively toward a common and valued goal… who have each been assigned specific roles or functions to perform, and who have a limited life span of membership" (Salas, Dickinson, Converse, & Tannenbaum, 1992, p.4). Team activity comprises two components of behaviour, taskwork and teamwork. Teamwork represents those instances where individuals interact or co-ordinate behaviour in order to achieve tasks that are important to the team's goals, whilst taskwork describes those instances where individuals in the team are performing individual tasks separate from their team counterparts.

These definitions are important because one of the major differences between the domains in which CRM has been used and driving is that in traditional CRM domains team responsibility for performance is explicit and team roles are well defined in comparison to driving. In driving, the existence of a team and the idea that all members of the team are responsible for safe and efficient driving cannot be assumed and would therefore need to form part of the training.

3.3 Civil Aviation CRM

The first CRM training program was implemented by a US airline in 1981 (Helmreich, Merritt, et al., 1999). CRM originally focused on changing attitudes that had been identified as distinguishing between highly skilled and less skilled pilots (Baker, Prince, Shrestha, Oser & Salas, 1993; Seamster & Kaempf, 2001). The focus was on social interaction in the cockpit and on changing attitudes towards teamwork (Salas, Prince, et al., 1999). However, attitude change does not always result in behavioural change, and programs have evolved to focus on training the skills that are associated with high team functioning.

Civil aviation CRM training programs have evolved through five distinct generations (Helmreich, Merritt, et al., 1999). Programs of the first generation were called cockpit resource management, and emphasized general behavioural strategies without clearly defining effective or ineffective behaviour. A major focus was on unassertive communication by junior officers and authoritarian behaviour on the part of captains (Collyer & Burdekin, 2001). CRM principles were applied in Line Oriented Flight Training (LOFT), in which crews in a simulator were exposed to emergency scenarios and practiced identifying and resolving problems as the scenario unfolded. Later, LOFT sessions were videotaped and crews reviewed the videotape and critiqued their own performance (Helmreich & Foushee, 1993).

The second generation programs were called crew resource management training and the focus was on team building, situation awareness, stress management, briefing strategies and team building skills. In the early 1990s, third generation programs emerged, addressing wider organizational factors that influenced the safety culture. CRM training was integrated with technical training, and addressed particular skills, such as the use of flight deck automation and human factors issues. Other members of the flight crew also received training, including flight attendants, dispatchers and maintenance workers.

The fourth generation programs were brought about by US Federal Aviation Administration (FAA) regulations that required CRM to be fully integrated into training programs and for it to be based on detailed analyses of the training requirements of particular aircraft. Training was also required for personnel involved in certifying and evaluating crews.

The fifth, generation of CRM emphasises management of error. Training is based on the idea that error is inevitable and training is provided in recognizing the limits of human performance and

managing errors as they arise (Helmreich, Wilhelm, Klinect, & Merritt, 2001). Coupled with these developments has been the instigation of confidential reporting systems for pilots to report threats to safety. In summary, the basis of fifth generation CRM is error prevention, achieved by carrying out three activities:

1. avoiding the error by preparation, planning and briefings;
2. trapping the error by checking, inquiry, advocacy and vigilance; and
3. mitigating the consequences of the error by developing decision-making strategies, task prioritisation and checklist management.

In addition to the five generations identified above, more recently, a six generation of CRM training programs has begun to emerge, referred to as "Threat and Error Management" (Helmreich, Klinect & Wilhelm, 1999). In addition to the management of error, threat and error management programs also emphasise the management of external threats such as errors and events that originate outside of the cockpit, such as high terrain, poor weather, aircraft system malfunctions and errors made by other agents in the system, including maintenance personnel and air traffic controllers (Klinect, Wilhelm & Helmreich, 1999).

Over the decades, many versions of CRM programs have been developed. There is great variation in the length of the training provided, the training methods used and the content of these programs (Salas, Prince, et al., 1999). Airlines have adapted programs to their own specific needs, and in countries with different cultural attitudes towards authority and teamwork, programs have been modified to increase cultural acceptance of the concepts involved (Helmreich, Merritt et al., 1999).

A range of information is used to identify training needs (see section 3.4). One important method used currently to identify the CRM skills to be trained and the problems to be addressed in training is the Line Operations Safety Audits (LOSA). LOSA involves trained observers collecting data during flights. A standardized checklist is used to collect the data on errors, threats to safety and how these are managed (University of Texas Line/LOS Checklist). All data collected are anonymous and confidential to ensure a non-punitive approach. Errors are then classified as procedural errors, communication errors, proficiency errors, decision errors or intentional non-compliance. Safety interventions can then be prioritised and training for error management can be tailored for the different types of errors (Helmreich, 2000). Problems are also identified from attitude surveys of flight crew, confidential incident reporting schemes and LOFT. CRM is therefore part of an integrated organizational safety management program (Collyer & Burdekin, 2001).

The US FAA provides comprehensive guidelines about the methods used and the content of CRM training (FAA, 2001). They recommend that training should include situation awareness, communication skills, teamwork, task allocation and decision-making. The training should include awareness, practice and feedback, with continuing reinforcement of the skills through LOFT simulator training and feedback. This is best achieved by integrating CRM principles into all aspects of training. The main content areas suggested by the FAA are shown below:

1. Communications processes and decision behaviour:
    a. Briefings.
    b. Inquiry/advocacy/assertion.

c. Crew self-critique.

d. Conflict resolution.

e. Communications and decision making.

2. Team building and maintenance:

a. Leadership/followership.

b. Interpersonal relationships and group climate.

c. Workload management and situation awareness.

d. Preparation/planning/vigilance.

e. Workload distribution.

f. Individual factors/stress reduction.

In addition, military CRM programs have been developed to meet the particular needs of military aviation.

3.4 Military Aviation CRM

In the military domain, Salas and colleagues applied a number of methods to identify potential behaviours to be trained. They used a combination of methods, including reviewing the literature, reviewing mishap reports, observing crews, interviewing crews, and crew ratings of important behaviours (Prince & Salas, 1993). Seven behaviours to be trained in CRM were identified (Prince & Salas, 1993). These behaviours are listed below:

1. Communication. Communication skills ensure that information about plans, problems and observations is communicated clearly. When communication is unclear, clarification is requested. Communication is acknowledged.
2. Assertiveness. Assertiveness is the ability to communicate opinions, make suggestions, raise questions and advocate for a position in an effective way, regardless of the relative seniority of those involved in the interaction.
3. Mission organizing and planning. Mission planning is the ability to develop plans and strategies for the mission, assign tasks and review plans throughout the flight.
4. Decision-making. Decision-making requires the ability to gather information, evaluate alternative actions and anticipate consequences.
5. Leadership. Leadership skills are used to assign tasks, establish procedures, and communicate plans, review plans and re-assign tasks dynamically. The leader should establish an environment in which feedback and opinions are elicited from all members.
6. Adaptability. Adaptability is important if plans need to be changed because of changed circumstances. It involves the ability to be receptive to other ideas and to flexibly change behaviour.
7. Situation awareness. Situation awareness refers to the capacity to extract relevant information from the environment, understand it and use it to anticipate future events. Teams should have shared situation awareness.

Canon-Bowers, Tannenbaum, Salas and Volpe (1995) reviewed the literature on teamwork skills and concluded that although many different skill labels were used, a core set of skills could be identified. These were: adaptability, shared situational awareness, performance monitoring and feedback, leadership, interpersonal skills, coordination skills, communication and decision-making.

Training for skill acquisition should include participants practicing the skills required and receiving feedback on their performance. The principles of practice and feedback are most effectively incorporated into scenario-based training. This involves designing scenarios that provide opportunities for participants to perform the necessary skills and knowledge. The design process begins with a task analysis to establish requirements. This is then used to develop training objectives, which are linked to the competencies required. Scenarios and performance measurement tools are developed from this knowledge.

A number of studies showed that the *combination* of teamwork, practice and feedback increased the transfer of training to the cockpit (Prince, Brannick, Prince & Salas, 1997). The components of the training were a lecture describing teamwork skills, videotaped models of effective and ineffective behaviours, and scenario based practice and feedback. Based on many empirical studies, these researchers developed a methodology for designing CRM training.

3.5 Identifying Skills for CRM Training

Specifying the behaviours to be trained is a crucial but relatively neglected issue in CRM training. Seamster and Kaempf (2001) argued that most airline CRM programs have only vague definitions of the skills required, making it difficult to develop targeted training programs. Although military CRM programs differ from those in commercial aviation (Helmreich, Merritt, et al., 1999), comprehensive research to provide a validated theoretical basis for CRM programs has been carried out by Salas and colleagues in the military domain. They argued that research on behaviour in effective teams should form the basis of CRM training (Salas, Prince, et al., 1999). Using this approach, McIntyre and Salas (1995) found that seven dimensions could characterize team performance: communication, adaptability, cooperation, acceptance of feedback, giving feedback, team spirit and coordination. From these dimensions, four essential teamwork behaviours were identified (McIntyre & Salas, 1995):

1. team members monitor each other's performance;
2. team members provide performance feedback to each other;
3. team members communicate effectively, often using closed loop communication to ensure that the message sent has been received and interpreted as intended; and
4. team members provide backup for each other.

Salas and Canon Bowers (1997) recommended that training programs should be developed by first identifying the skills required in the operational setting and then using this to develop the KSAs required. From this step, methods for measuring the skills are developed and, finally, training methods are identified. Salas, Prince, et al. (1999) developed the method further and provided a comprehensive set of guidelines for the design and delivery of CRM training. A summary of these guidelines is presented in Table 3.1.

Table 3.1 Methodology for the development and delivery of CRM training program – from Salas, Prince, et al. (1999)

Step	Procedure
1. Identify operational requirement.	Review existing training materials, including course material lists, instructor guides, standard operating procedures Interview SMEs Observation of crews performing missions Review mishaps/accident reports.
2. Assess team training needs and coordination demand.	Using material from step 1, specify all tasks involving teamwork and identify deficiencies in existing team training procedures.
3. Identify teamwork competencies and KSAs.	Link training needs to competencies required for performing the team tasks identified during step 2.
4. Determine team training objectives.	For each KSA, determine objectives that can be empirically evaluated.
5. Determine instructional delivery method.	Determine delivery method e.g. information, demonstration, or practice and feedback.
6. Design scenario exercises and create opportunities for practice.	Design scenarios to give trainees an opportunity to demonstrate KSAs.
7. Develop performance assessment/ measurement tools.	Develop reliable and valid measures that can assess whether each of the KSAs were demonstrated.
8. Design and tailor tools for feedback.	Design tools to be used during debrief in order to measure team behaviours exhibited and also to diagnose poor performance and provide guidance.
9. Evaluate the extent of improved teamwork in the cockpit.	Design experiments to assess effectiveness of the training.

Canon-Bowers et al. (1995) also argued that in order to define team training requirements, the competencies required by teams should be defined. KSAs for successful teamwork need to be identified. However, because teams operate in variable environments in which different tasks are completed under different task and environmental conditions, they argued that an *understanding of the context in which teams perform is essential*. Different operational contexts mean that the KSAs identified suggest different instructional strategies. They defined four types of team contexts that suggest different types of competencies:

1. Context driven. Teams need context driven competencies if they are performing demanding tasks requiring them to adapt to changing task demands.
2. Team contingent. Team contingent competencies are required if team members are consistent and they perform a variety of tasks.
3. Task contingent. Task contingent competencies are required when there is a specific team task, but high turnover of team members. Skills that do not depend on particular team members are therefore needed.
4. Transportable. Transportable competencies are used when there is a variety of tasks and a variety of team members.

These insights provide some guidance for developing CRM programs for driving. The context in which a driver and passenger team operates is most likely to be task contingent or transportable. The critical task contingent and transportable competencies are awareness of role responsibilities, task sequencing, team role-interaction patterns, task structuring mission analysis, feedback and performance monitoring, coordination, assertiveness, planning situational awareness, interpersonal skills and communication. The training methods most suited to these teams are lectures and passive demonstrations, followed by task simulation, guided task practice and role-playing.

3.6 CRM Training Methods

It is generally accepted that CRM skills are trained using four general strategies: information, demonstration, practice and feedback (Stout et al., 1997; Beard, Salas & Prince, 1995). These strategies form four phases of the training, each fulfilling a different purpose. Different training methods can be used for each of the four training phases. Table 3.2, taken from Beard et al., (1995), summarises the methods commonly used.

The inclusion of practice and feedback improves training effectiveness and increases the rate of skill transfer to the cockpit (Prince et al., 1997), and the FAA emphasises the centrality of practice and feedback to CRM programs (Baker et al., 1993). The basis of the effectiveness of practice and feedback can be found in the skill acquisition literature (Salas et al., 2000). Although lectures can impart knowledge about CRM skills, use of the skills is most effectively taught through practice. The combination of both lectures and practice ensures that both declarative (what the skills are) and procedural knowledge (how and when to use the skills) is taught. Feedback on performance is important in helping people to identify how to improve their performance. Process feedback is more effective than outcome feedback because it enables participants to learn how to perform the skills. Training can also be enhanced through observation of effective and ineffective behaviour and by having participants rate the behaviour they are observing. Finally, metacognitive training, in which participants develop insight into their own cognitive processes, has been shown to improve the performance of leaders (Salas et al., 2000).

In their review of young driver training programs, Senserrick and Morrison (2003) concluded that the most effective method of training young drivers was a combination of knowledge, imparted in a classroom setting, and practical experience. This accords with the evidence accumulated in research on CRM training.

Table 3.2 CRM training methods – from Beard et al. (1995)

Training strategy	Training methods	Definitions
Information	Lecture Discussion Reading	Present basic knowledge to support skill acquisition.
Demonstration	Mishap reports Videotapes Audiotapes	Present examples of situations in which the skill or behaviour occurs.
Practice	Role plays Simulations Group exercise	Behavioural practice including use of skills in a realistic setting.
Feedback	Observer training Videotape review Verbal review Simulation outcomes	Evaluate trainee performance and provide feedback to trainee.

3.7 Provision of Practice

The practice component of the training can be provided either through role-plays or simulator exercises (Baker et al., 1993). High fidelity simulators are expensive and several studies have investigated the efficacy of low fidelity PC-based simulations and role-plays.

3.7.1 Role Plays

In a role-play trainees participate in a designed scenario while playing a designated role (Beard et al., 1995). They are required to respond to events as they occur according to their role. Discussion and feedback occur after the role-play. Creating a realistic role-play that is able to elicit realistic behaviours from the participants requires skill (Baker et al., 1993). Role-plays are valuable because they provide practice and feedback at low cost (Beard et al., 1995). The scenarios are usually semi-structured so that there is a framework to guide events, but actions are not pre-determined. The idea is to have participants choose which actions to perform. Beard et al. (1995) provided comprehensive guidelines for designing successful role-plays, and these are summarized below:

1. Identify training objectives.
2. Use subject matter experts to ensure relevance and credibility.
3. Develop scenarios that will elicit the desired behaviour. Scenarios should include the conditions in the situation and a general description of the characters.
4. Scenarios should be specific to a particular aircraft.
5. Outline the major events and introduce these into the scenario using event cards or equipment, or by including events in the roles.

6. Determine the facilitator's role. This could be participation in the role-play, providing external cues or observing.
7. Provide opportunities for practice and decide who should participate. A role play can occur with all participants observing, more than one role play can occur at once each with a facilitator and observer, or all members can participate, with an observer for all role plays.
8. Roles for each player should include who the person is and what is occurring from their perspective. Their attitudes, abilities or general approach to situations can also be included.
9. Use equipment such as video to create a realistic atmosphere.
10. Use observer rating forms to record whether the behaviour occurred.
11. Write debriefing information for the facilitator that includes what should have occurred during the role-play, the behaviours of interest, and the questions the facilitator should ask. Issues that should be covered include reactions to the role-play, diagnosis of events, the behaviours that were observed, alternative behaviours and learning points.
12. Provide detailed guidance on running the role-play for the facilitator.
13. Pilot test and review the role-play to ensure the scenario elicits behaviour, to assess whether the rating form is adequate and whether the instructions are sufficiently detailed.

Prince and Jentsch (2001) note that trainee acceptance of role-plays can be low and this is important because acceptability is related to how successful the training is in imparting skills.

3.7.2 Low Fidelity Simulation

Low fidelity simulations have the advantages of low cost and portability, and can include many of the same elements of tasks in the real world. Similarities in processing and resource demands between the simulation and the real world tasks are particularly important, even more so than the surface features of the task (Gopher et al., 1994).

For example, the demands of multi-tasking can easily be introduced into low fidelity simulations. Crucially, they provide the opportunity for performance feedback to be given, which is viewed as an essential element of CRM skill acquisition.

Although role-plays can also be viewed as low fidelity simulations, low fidelity simulation devices usually involve a desktop computer with various peripherals, such as multiple monitors, joysticks, yokes, headsets and recorded voices. The software is usually commercially available. Although the physical fidelity is low the task fidelity is high, with pilots performing the same sorts of tasks as they would in the cockpit (Prince & Jentsch, 2001).

Baker et al. (1993) evaluated trainees' reactions to using a single player aviation computer game to train CRM skills. The game was a low fidelity flight simulation designed to be played by a single player. The aircraft was controlled with the keyboard and control yokes, with auditory input provided through speakers and scenarios were shown simultaneously on three monitors. Participants' reactions to the simulation were positive, with most participants rating it highly as a medium for training CRM skills. However, data on skill acquisition and transfer of training to the cockpit were not gathered. Jentsch and Bowers (1998) also found high trainee acceptance of low fidelity simulation training.

Several authors have recommended that low fidelity simulation be used as an adjunct to simulator training (Baker et al., 1993). Prince and Jentsch (2001) recommended that low fidelity simulations be used to supplement existing training. This would create a graduated program that progresses from basic lecture information to low fidelity simulation and finally to high fidelity simulation, in which high task complexity can be introduced more effectively. They also recommended that role-plays be replaced with low fidelity simulations. To ensure the effectiveness of the training, structured scenarios should be used and scenarios should be designed to be as realistic as possible and must elicit realistic behaviours (Prince & Jentsch, 2001). The hardware used should have sufficient power to create realism and there should be a method for recording CRM behaviours (Baker et al., 1993).

3.8 Effectiveness of CRM Training

A number of studies have been conducted in order to assess the effectiveness of CRM training programs. According to Flin and Martin (2001) initial efforts to assess the value and impact of CRM training have consisted of standard training and evaluation techniques based on pilots' opinions of the quality and relevance of the programs. According to Salas, Prince, et al. (1999) studies have consistently found that CRM improves teamwork skills by between 8% and 20%. They also concluded that there is evidence that these skills can be successfully imparted through training. There are a number of different ways in which to assess the effectiveness of CRM training interventions, including the assessment of trainee reactions and attitudes and the evaluation of CRM behaviours. The following section investigates the evaluation of CRM training programs reported in the literature and also identifies potential methods that could be used to evaluate the effectiveness of future driver CRM training interventions.

3.8.1 Trainee Reactions

The acceptability of CRM training to participants is a key determinant of its success. Reviewing evaluations of CRM programs that included LOFT, Helmreich and Foushee (1993) reported that most participants rated CRM as both relevant and useful. However, most researchers in this area report that there is a small group of participants that is resistant to CRM principles and methods, and that develops negative attitudes to CRM as a result of the training (Helmreich & Wilhelm, 1991; Helmreich & Foushee, 1993; Helmreich & Merritt, 2000). Some of the factors that are associated with negative attitudes following CRM have been identified by Helmreich and Wilhelm (1989, cited in Helmreich & Foushee, 1993). They found that crewmembers low in achievement motivation and interpersonal skills were more rejecting of CRM and the influence of a charismatic leader who openly rejects CRM can influence others to also reject CRM.

3.8.2 Trainee Attitudes

The Cockpit Management Attitudes Questionnaire (CMAQ) was developed to assess crew attitudes and can be administered before and after training to evaluate the impact of the training. It has been validated by comparing attitude ratings with the performance ratings made by trained observers (Helmreich, Foushee, Benson, & Russini, 1986). The Flight Management Attitudes Questionnaire (FMAQ) has also been developed to take into account cultural differences in attitudes. The CMAQ has been adapted for use in evaluating the effectiveness of CRM training in

other domains, including offshore oil platforms (O'Connor & Flinn, 2003) and medicine (Sexton, Thomas & Helmreich, 2000).

A number of studies have found that attitudes significantly improve after training. However, it is unclear to what extent attitude change results in behavioural change. For example, Helmreich and Wilhelm (1991) reported that attitudes, as measured by the CMAQ, improved on three subscales after training: communications and coordination, command responsibility and recognition of stressor effects.

3.8.3 Behavioural Evaluation

Developing the tools to rate and assess CRM behaviours poses a significant challenge. A number of methodologies have been developed in the aviation domain in order to assess CRM skills exhibited by pilots. According to Flin and Martin (2001) CRM evaluations are now beginning to focus on the observation of the practice of CRM skills, and the development of reliable and valid measures for assessing a crew's or a pilot's non-technical skills. Flin and Martin describe the use of behavioural markers in assessing CRM skills. The term *behavioural markers* refers to a prescribed set of behaviours indicative of some aspects of performance (Flin & Martin 2001). Flin and Martin conducted a review and survey of the use of behavioural markers for training and assessing non-technical skills in international and UK domestic airlines. Within this review, a number of existing CRM assessment techniques were identified, including the Line/LOS Checklist, which is used to evaluate crew performance, the CRM assessment expert system tool (Dutra et al., 1995, cited in Flin & Martin 2001), which is a computerised tool used to rate observable CRM behaviours, and the Targeted Acceptable Responses to Generated Events or Tasks (TARGETS) methodology (Fowlkes & Shawn, 2004), which is used to rate pilots behavioural responses to predetermined events.

In addition to the techniques outlined above, it is apparent that there are a number of human factors team evaluation methodologies that could potentially be used to analyse the effectiveness of CRM training programs in young driver training. A brief description of these methods is given below:

1. Co-ordination demands analysis (CDA; Burke, 2004). CDA is used to rate the co-ordination between agents involved in teamwork activity. CDA uses a co-ordinated behaviour taxonomy consisting of teamwork behaviours (communication, situational awareness, decision making, mission analysis, leadership, adaptability and assertiveness). The CDA procedure involves rating each co-ordinated behaviour on a scale of 1 (low) to 3 (high) based upon an observation of the task(s) under analysis. From these individual ratings a 'total coordination' figure for each teamwork task step is derived.
2. NOTECHS (Flin, Goeters, Hormann & Martin, 1998). A major advance in this area has been the European Commission sponsored project to develop a system called NOTECHS that evaluates non-technical skills. The NOTECHS system offers a structured approach for assessing pilots non-technical skills (e.g. team member cooperation). NOTECHS uses a rating form consisting of four categories of behaviour: co-operation, leadership, situation awareness and decision-making. NOTECHS ratings are based upon an observation of the scenario under analysis. Everyday examples of the behaviours are provided to increase consistency in raters' interpretations of the behavioural descriptions. There are also extensive guidelines

about what behaviour to observe and how to rate it (O'Connor, Hoermann, Flin, Lodge & Goeters, 2002).

3. Social Network Analysis (SNA). SNA is used to analyse and represent the relationships between teams or agents within a social network. A social network is defined as a set or team of agents that possess relationships with one another (Driskell & Mullen, 2004). SNA is based upon the notion that the relationship between agents within a social network has a significant effect upon the actions performed and also the performance achieved by the network. SNA uses both graphical and mathematical procedures to represent social networks. Typically, centrality measures are calculated for each agent (e.g. degree, betweenness and closeness) and the overall network density is calculated. This allows for the identification of the key agents within the network and also the classification of the network structure.
4. Team communications analysis (Jentsch & Bowers 2004). Team communications analysis involves recording and analysing the communications between team members during a particular task or scenario. Typically, the communications between team members are recorded using frequency counts of speech and communications acts (Jentsch & Bowers, 2004).
5. Team Mutual Awareness Questionnaires (MacMillan, Paley, Entin & Elliot 2004). According to MacMillan et al. (2004) the extent to which team members are informed of other team members' awareness (i.e. team mutual awareness) provides a measurable construct for assessing the presence of shared mental models. MacMillan et al. (2004) developed a set of Mutual Awareness Questionnaires that can be used to assess a team's mutual awareness. These are the Task Mutual Awareness Questionnaire, the Team Workload Awareness Questionnaire and the Teamwork Awareness Questionnaire. From the questionnaires, a subjective assessment of task importance, team member workload, and ratings of team member communication, back-up, coordination and information-management, and leadership/team orientation is derived.
6. Behavioural Observation Scales (BOS). BOS are used to measure the observable aspects of team behaviour (Beaubien, Goodwin, Costar, Baker & Smith-Jentsch, 2004). Typically, some sort of scale (i.e. rating scale, checklist) is used to measure team behaviour.
7. Targeted Acceptable Responses to Generated Events or Tasks (TARGETs; Fowlkes & Shawn, 2004). The TARGETS approach is used to measure responses to particular events in a scenario under analysis. Typically, trigger events and appropriate individual and team responses are defined prior to the scenario under analysis and a checklist is used to record the occurrence or non-occurrence of responses to the trigger events during the scenario (Fowlkes & Shawn, 2004).

While the techniques outlined above demonstrate potential for evaluating CRM training programs in the driving domain, it is the opinion of the authors that the development of a driving-specific CRM training evaluation methodology is one of the key requirements of future research within this area. Due to the novelty of this research into CRM training in the driving domain, it is apparent that such a methodology does not yet exist.

3.8.4 Simulator Studies

There is agreement that multiple levels of evaluation are necessary in order to provide converging evidence of the effectiveness of CRM training (Holt, Boehm-Davis & Beaubien, 2001; Salas, Prince, et al, 1999). Because CRM programs target individual and team behaviour, evaluations should also focus on individual and group outcomes. Salas, Prince, et al. (1999) recommended four levels of evaluation. These involve assessing crew reactions to the training, learning, ability to perform the skills and the impact on the organization. A multi-level approach to evaluation allows areas of weakness in the training to be identified and also allows identification of areas requiring further training. Support at all levels of measurement can be taken as strong validation of the training program (Stout et al., 1997).

In two studies, Salas, Fowlkes, Stout, Milanovich and Prince (1999) used a multiple measurement approach to evaluate the effectiveness of a CRM program that addressed four skills: communication, assertiveness, mission analysis and situation awareness. Their assessment involved measuring attitudes towards teamwork skills, reactions to the training, (measured using 5-point Likert scales and free responses), knowledge of teamwork principles using a multiple-choice knowledge test and use of the skills during simulated flight scenarios. In one study behavioural evaluation in a low fidelity PC-based simulator was used whereas a full mission simulator was used for the other study. Observers were trained and rated behaviour independently while viewing videotapes of the scenarios. Inter-rater reliability was high in both studies. Training usefulness was rated highly and knowledge scores were high. Training resulted in more positive attitudes to teamwork and performance during the evaluation scenarios was higher for teams that received CRM compared to those who did not.

Stout et al. (1997) also used a multiple measurement approach to evaluate a CRM program. Their results indicated that the program was rated as highly useful and important. Comparing an untrained and trained group, the program resulted in positive attitude change and higher knowledge. Independent raters evaluated behaviour during simulated scenarios. Results showed that the trained group demonstrated between 8 and 13% more CRM skills than the untrained group.

3.8.5 Low Fidelity Simulations

Prince et al. (1997) assessed skill acquisition from one low fidelity scenario to another. They found that if crews were given practice only, on a low fidelity simulator their performance did not improve. When they were also given performance feedback and a formal debriefing, performance did improve as a result of low fidelity simulation training.

Brannick, Prince and Salas (2002) assessed skill acquisition in a CRM program that involved a lecture, observations and discussion, followed by training with a low fidelity simulator and performance feedback. Trainees were assessed post training while flying a scenario in a high fidelity simulator. Performance in the high fidelity simulator had improved for the same events as those they were exposed to in the low fidelity simulator.

3.8.6 Experimental Evaluation

Using a quasi-experimental design in which trained and untrained groups were compared, Boehm-Davis, Holt and Seamster (2001) evaluated a CRM program that focused on crew briefings, communication during normal and abnormal situations, situation assessment, planning and decision making. They used data gathered from recurrent Line Operation Evaluations (LOE) conducted as part of the certification process for pilots. Data were collected once per year for three years. The first year data were baseline data prior to the introduction of the training. Post CRM training data were collected for two years. In addition to performance data, they collected knowledge and attitude data. Results from independent observers of the pilots' performance, evaluators' ratings of the pilots and self-reports from the pilots showed that the trained group had higher scores on most measures, indicating that training had effectively imparted CRM skills.

3.8.7 Field Evaluations of CRM

Helmreich, Wilhelm, Gregorich and Chidester (1990) assessed critical crew behaviour during flights and LOFT sessions using the Line/LOS Checklist and compared ratings for crews who had received CRM training and those who had not. Amongst crews who had received training, a higher percentage were rated as above average and fewer were rated as below average compared to untrained crews.

It has been difficult, particularly within the aviation domain, to assess the effects of CRM training upon accident rates. According to Helmreich et al. (1999) the overall accident rate is so low that it will never be possible to assess the impact of CRM training during a period of time. Additionally, Helmreich et al. (1999) suggest that the variability of CRM training programs and the unusable nature of incident reports also make the assessment of CRM effectiveness a difficult proposition. However, it is generally accepted that CRM training interventions have been successful. Gregorich and Wilhelm (1993) suggest that, to date, evaluations of CRM programs across a variety of organisations have demonstrated a positive impact.

3.9 Reinforcement of Training

Reinforcement of CRM training is necessary to maintain positive changes in behaviour (Helmreich, Merritt, et al., 1999). Helmreich (1991, cited in Helmreich & Foushee, 1993) found that although CRM training resulted in attitude change, without reinforcement, attitudes had returned to baseline levels one year later. Similar results have been found in the driver-training field and it is now generally accepted that the impact of short-term training is low, especially if it involves attitude change (Senserrick & Morrison, 2003).

3.10 Other Factors Influencing CRM Training Effectiveness

Factors outside the program can also affect the effectiveness of the training. Pre-training factors that increase the success of the program include supervisory and management support for participation (Boehm-Davis et al., 2001), trainee choice to participate (Baldwin, Magjuka & Loher, 1991), and pre-training experiences (Smith-Jentsch, Jentsch, Payne & Salas, 1996). Pilots who had

felt unsafe while flying with another pilot or who had experienced a crisis caused by poor communication were more likely to benefit from the training and were more motivated to participate. Post training factors such as supervisor and organizational support for using the skills and opportunities for practicing the skills all increased the likelihood that skills would transfer from training to the cockpit (Salas et al., 2000). Helmreich and Foushee (1993) found that despite a well-received CRM program being implemented in one organization, trainee attitudes towards CRM had not changed because of poor management support for continuing revision of the program and integration of the program into recurrent training.

3.11 Applications of CRM Training in Domains Other than Aviation

The application of CRM training programs has not been limited to the aviation domain. Indeed, there is no theoretical reason why CRM training cannot be applied in domains other than aviation (Helmreich, Wiener & Kanki, 1993). As generic teamwork skills are fundamental to CRM programs, it is feasible that CRM training could potentially be applied in any domain involving collaborative or teamwork activity. In the past CRM training programs have been applied across a wide range of domains, including offshore oil (O'Connor & Flin, 2003), medicine (Howard, Gaba, Fish, Yang & Sarnquist, 1992), helicopter mountain rescue (Schmeiser, Bömmel & Bühren, 2000), air traffic control (Smith-Jentsch et al, 2001), maritime operations (Bydorf, 1998; Barnett, Gatfield & Pekcan, 2004), nuclear power (Harrington & Kello, 1992, cited in Flin & O'Connor, 2001) and the rail safety domain. The following section investigates how CRM training programs have been implemented in the offshore oil, medicine and air traffic control domains.

3.11.1 Offshore Oil Platforms

Crews working on offshore oil platforms work in a complex, high risk and isolated environment. Following the Piper Alpha disaster in the United Kingdom in which there was an explosion on an oil platform that resulted in large loss of life, investigators recommended the introduction of CRM training programs. A number of companies now provide CRM training for control room operators, managers and emergency response teams (Flin & O'Connor, 2001). The content of these programs is very similar to that of aviation CRM programs. For example, a program for control room operators included modules on decision-making, communication, assertiveness and stress. The training methods included lectures, exercises, discussions and role-plays.

A different program was devised for managers and their emergency response teams, based on skills identified as important by staff, the competency standards for managers, and other CRM programs. The skills included the following:

- roles and responsibilities;
- assertiveness;
- team decision making;
- team attitudes; and
- stress management.

For offshore crews, a specialised two-day course was developed based on the delivery of information through lectures, practical exercises, videotapes and case studies. The areas covered in the course were as follows:

- introduction to CRM;
- situation awareness;
- decision-making;
- communication;
- team coordination; and
- personal resources.

Flin and O'Connor (2001) recommended that, to successfully adapt CRM to a new domain, a thorough training needs analysis should be undertaken. Although existing materials can be adapted from other domains, they should be customized by including input from domain experts so that examples are as realistic as possible.

A subsequent report from O'Connor and Flin (2003) described the development of these programs in more detail. They applied the framework developed by Salas, Prince, et al. (1999), which involved three major steps: determining training requirements, developing training methods and evaluating the training. To determine training requirements they examined accident and incident reports and found that, similar to aviation, the majority of accidents could be attributed to human error. They then identified the team skills that are required for safe operation:

- situation awareness;
- decision making;
- communication;
- team work;
- supervision/leadership; and
- personal resources (stress, fatigue, illness).

The training methods and materials were adapted from existing CRM programs in a number of domains, with content specific to the offshore oil industry being included. Lectures, group exercises, group discussions, questionnaires and videos were used to train the skills, but opportunities for practice were limited due to the unavailability of a simulator. The training was evaluated by examining trainees' reactions to the course using a questionnaire adapted from the CMAQ and their knowledge was assessed. Participants had to identify the human factors causes of accidents in a written scenario both before and after the training. Reactions to the training were generally positive and the questionnaire elicited useful suggestions for future courses. However, there was no change in attitudes or knowledge after the training. This was probably because of problems with the design of the evaluation methods. The evaluation was also carried out at the end of the training when workers were preparing to return home after a period offshore.

3.11.2 Medicine

An extensive survey of attitudes to teamwork, stress and error in intensive care unit personnel found that junior hospital staff rated teamwork as ineffective in hospitals, surgeons displayed authoritarian attitudes, and errors were not discussed and handled appropriately (Sexton et al., 2000). Although these attitudes suggest that CRM training might be needed in hospitals, the development of CRM training programs in this domain has been relatively slow.

CRM was first introduced into the medical domain in anaesthesiology, and most of the theoretical developments and applications of CRM in medicine have taken place in this area. In this specialty, doctors work with highly complex automated equipment in a safety critical environment where leadership and communication skills are vital in coordinating with the surgical team (Davies, 2001). The recognition that anaesthetists had little exposure to crisis situations and therefore little practice managing crises led to the development of anaesthesia crisis resource management (ACRM) (Howard et al., 1992). The aim of ACRM is to provide trainees with a repertoire of responses to critical incidents and to train them to coordinate and use all available resources in a crisis situation (Howard et al., 1992).

Courses typically start with half-day information sessions in which human performance and error are discussed and videotapes of anaesthetic mishaps are shown. The characteristics of effective and ineffective performance are discussed. Simulator training in which the anaesthetist manages a number of crisis scenarios follows. Each simulator scenario is followed by an extensive debriefing session during which the management of the crisis is critiqued and analysed. Some ACRM courses include the whole operating room team as actors in the simulation, but in only one course do members of other professions receive training alongside the anaesthetist. Team training is therefore limited (Davies, 2001).

Developing methods to reliably assess both technical and behavioural crisis management skills has been difficult (Gaba, et al., 1998). Very few evaluations of ACRM training have been conducted, although some work has been completed on developing evaluation methods. Gaba, et al. (1998) developed a checklist of crisis management skills, based on the Line/LOS Checklist developed for aviation. They had raters assess to what degree the following behaviours were exhibited during simulated anaesthesia crises:

- orientation to case;
- inquiry/assertion;
- communication;
- feedback;
- leadership;
- group climate;
- anticipation/planning;
- workload distribution;
- vigilance; and
- reevaluation.

ACRM differs in a number of important ways from CRM in the aviation domain. First, although operating room teams are composed of surgeons, surgical nurses, anaesthetists and anaesthetic nurses, who each come from different professional cultures and backgrounds, usually only anaesthesiologists are provided with ACRM training. As a consequence, only a sub-group of the operating room team acquires skills in effective teamwork, and the interaction between team members is addressed from one side only. Therefore, the full potential for CRM to improve teamwork has not been realised (Davies, 2001; Helmreich & Davies, 1997). Second, ACRM focuses on the management of crises with only a part of the training involving effective resource management. ACRM can therefore be characterized as involving only part task training, which has been seen as a deficiency by some commentators (Davies, 2001; Helmreich et al., 2001). Not including all members of the operating room team might be seen as an effect of the strong culture of error denial in medicine that has made it particularly difficult to implement safety programs in this domain. ACRM can be seen as a positive step forward by a medical specialty that places a high emphasis on a culture of safety (Gaba, 2000; Helmreich, 2000).

3.11.3 Air Traffic Control

The development of CRM for air traffic control (ATC) teams has been motivated by an understanding of the different needs of teams in this domain. Air traffic control teams differ from aircrew teams in the allocation of responsibility for decisions and their consequences and the status and stability of team membership (Smith-Jentsch, Baker, Salas & Cannon-Bowers, 2001). Individual controllers have personal responsibility for aircraft under their control, but teamwork is involved when aircraft are passed from one controller to another. The amount of information passed on, the spacing of the aircraft and the orderliness of the traffic directly affects the ability of the receiving controller to work effectively. This means that CRM for ATC needs to focus on supportive attitudes and behaviour rather than on shared responsibility, as is the case in CRM for aircrew (Smith-Jentsch et al., 2001). In contrast to the clear leadership role of the captain, in ATC individuals regularly rotate through the controller-in-charge position. The role is one of coordination rather than authority and controllers generally regard each other as peers. As a result, there is less need to teach assertive communication skills. Assertiveness training for aircrew was introduced to enable junior members to communicate directly with more senior officers, but most ATC teams are stable with members working together for extended periods.

Smith-Jentsch et al. (2001) have described the development of ATC training programs. Through extensive field research, the KSAs relevant to effective teamwork in ATC were identified. Four skills central to ATC teamwork were identified: information exchange; supporting behaviour (offering and accepting assistance); team feedback skill; and flexibility. Although these skills are different from those usually trained in aircrew CRM, there are commonalities. For example, information exchange supports shared situation awareness. Supporting behaviour involves monitoring your own and others' workload, communicating effectively and flexibly adapting to changing situations. Team feedback requires the ability to listen accurately and communicate in an objective manner so that feedback is received as non-threatening.

Five types of knowledge were identified: team-mate-generic knowledge comprised of interpositional knowledge (knowledge of the tasks performed by other teams); knowledge about teamwork; and knowledge about the performance-related symptoms of stress. Team-mate specific knowledge was knowledge about team-mates' characteristics that indicate in which situations they

might require assistance, and knowledge about team task expectations, including shared expectations and preferred strategies.

The relative stability of ATC teams led to team mate-specific knowledge and attitudes being identified as important for ATC teams. These concepts had not previously been incorporated into CRM programs. Team-mate specific attitudes include collective efficacy, mutual trust and team cohesion.

The program is structured around three components:

1. Workshops to build awareness and knowledge. This includes group discussions and computer based instruction.
2. Practice and feedback. This involves applying the four skills in simulated scenarios. Although the physical fidelity of the simulation can vary, scenarios are based on realistic events derived from incident reports and field observations. To be effective, training should occur with the whole team together. Because teams are so stable they need to be able to practice their skills together and develop team mate-specific knowledge.
3. Continual reinforcement occurs through performance feedback on the job.

3.12 Summary

Interest is developing in the road safety community in driver training programs that focus on training higher order skills in addition to vehicle control skills. However, to date there has been no attempt, to the knowledge of the authors, to adapt training techniques from other domains for driver training, and few, if any, studies have reported *training interventions* that specifically target the *interaction* between young drivers and passengers.

CRM training has been used in many domains to train teams to function more effectively and many of the skills trained are higher order cognitive skills such as self-awareness, performance monitoring of self and other team members, communication skills, and planning and workload management. These skills are similar to those that have been placed in the highest two levels of the driving skills hierarchy developed by Hattaka et al. (2002). This implies that CRM training has the potential to be beneficial for young driver training.

The literature review here has shown that the defining features of CRM training are the provision of practice in scenarios derived from the domain, combined with performance feedback given to participants. Although programs adapted for use in different domains may differ in content, the provision of practice and feedback are common elements, and the evidence shows that practice and feedback are crucial for imparting skills. The literature also demonstrated how the skills to be trained could be identified by defining the KSAs required for effective functioning in the domain. In addition, the four crucial teamwork skills identified by McIntyre and Salas (1995) (monitoring, performance feedback, effective communication and backup) are particularly relevant for driver training. Passengers could be trained to monitor drivers' performance and communicate effectively if there are hazards or other pieces of crucial information that the driver has missed; or if the driver is not driving safely, passengers could provide backup by alleviating workload at times of high stress.

One of the key points emphasised in the literature is the requirement to adapt the training to the needs of the domain. This is likely to be especially important in the driving domain because there

are significant differences between other domains in which CRM has been used and driving. These differences are discussed in Chapter 5.

Chapter 4 Analysis of Young Driver Training in the ACT

In order to identify potential areas in which CRM training could be incorporated into current young driver training in the ACT and to determine whether any CRM principles are already covered in that training, an analysis of the principal young driver training program currently delivered in the ACT was conducted. This analysis involved reviewing the literature associated with the program, including course information and documentation, advertising leaflets, teaching resources, websites, and any other relevant information in order to identify potential application areas and also the extent to which CRM principles are already covered. The following chapter provides an overview of the principal young driver training program currently delivered in the ACT and presents the outcomes of the analysis.

Young driver training in the ACT is delivered through an innovative program called Road Ready that is tightly integrated with the driver licensing system. The program has several stages designed to introduce skills gradually and includes teenagers before they start learning to drive to solo drivers. The Road Ready program has four key aims:

1. to encourage early learning of risk and hazard recognition;
2. to encourage accumulation of driving experience under safe conditions;
3. to raise awareness of the complexities of driving; and
4. to enable new drivers to identify, relate to and avoid, high-risk behaviors and high-risk situations.

Road Ready has four components that are designed to provide education for young people from the pre-learner stage to when they are licensed drivers:

1. **Pre-Learner module**. Participants are younger than 15 years and 9 months and have not yet started to learn to drive. As passengers, they are encouraged to learn about driving and the road environment.
2. **Road Ready classroom module**. This module is a 13 hour course delivered in High Schools as part of the Year 10 curriculum or in the community by an accredited private provider. The module focuses on the complexities of driving. Individuals who are at least 15 years and 9 months, who have successfully completed this module and who pass the road rules knowledge test can apply for a Learner Licence.
3. **Learner module**. Learners practice driving and develop in-vehicle control skills. The need for driving practice in a range of road environments and conditions is emphasised and a minimum of 50 hours of supervised practice is recommended. During the learner period, participants learn and practice 22 driving competencies. Individuals who have held a Learner Licence for at least six months and who are at least 17 years of age can apply for a Provisional Licence.
4. **Solo Driver module**. The aim of the module is to provide support for new drivers at a time of high risk by further raising their awareness of the risks and complexities of driving. This

module includes an optional five hour course called Road Ready Plus, which new drivers can undertake once they have held their Provisional Licence for six months.

4.1 Pre-Learner Module

This course already uses some of the aspects of CRM to help young passengers develop their skills. For example, commentary driving, co-navigating and error spotting are all skills that could be used by a passenger to assist the driver. The teaching material does not mention how passengers could assist drivers, but this is probably appropriate because at this stage, learners need to develop their own skills rather than learn how to co-ordinate their skills with those of someone else. *Accordingly, it is recommended that if formal CRM techniques are to be introduced, later stages of the program would be most appropriate.*

Students are responsible for delivering the booklet, "Preparing your pre-learner for driving", to their parents. The booklet explains the nature of commentary driving and encourages parents to help their teenager to develop driving skills before their teenager starts to drive. The strategies are used as the parent and young person are driving. The young passenger acts as a co-pilot while sitting in the front passenger seat. Recommended activities consist of the following:

1. Commentary driving. The driver and young passenger commentate about what the driver is doing, what the driver is thinking and about the perceptual skills that the driver is using while driving.
2. Co-navigating. The young passenger navigates in familiar and unfamiliar environments, following routes in a street directory and looking for specific streets. The idea is to develop cognitive maps of the area.
3. Error spotting. The young passenger identifies mistakes and errors made by other drivers, and observes the different behaviours of drivers at intersections.
4. Speed sensitivity. Young passengers' awareness of speed is built by having them estimate the speed of their own and other vehicles, notice the cues that indicate speed, judge headways and talk about the impact of speed on safety.
5. Planning ahead. The idea behind this activity is for young passengers to develop the skills of planning a journey. The young person estimates journey times at different times of the day and in different conditions, and plans alternative routes and rest breaks.

As previously discussed, it appears that it would not be suitable to provide formal and comprehensive CRM training at this stage of young driver training. However, the skills taught are all crucial components of CRM skills. For example, being able to spot errors and judge speeds are pre-requisites for being able to provide feedback to drivers about errors and speed. It is apparent that the existing Pre-Learner module could act as an essential pre-requisite for CRM training, and that the effectiveness of CRM training may be directly related to the success of this module.

4.2 Road Ready Classroom Course

The Road Ready classroom course is aimed at pre-learners and is delivered either in High School as part of the Year 10 curriculum or in the community through an accredited private provider. It consists of a 13 unit, 13 hour road safety program, which culminates in participants completing a

computerised road rules knowledge test. Successful participants, who must also meet the age requirement of 15 years 9 months, can apply for a Learner Licence.

From the course material, it can be seen that the program covers a number of topics:

1. Complexity of the driving task:
    a. Emphasises the skills required for driving.
    b. Risk analysis.
2. Workload issues:
    a. Cognitive, psychological, social and physical demands.
    b. Speed, stopping, scanning, hazard recognition and management.
    c. Planning and navigation.
3. Human factors:
    a. Drugs.
    b. Fatigue.
    c. Emotions.
    d. Expectations.
    e. Peers and passengers.
4. Putting driving into context:
    a. Driving environment.
    b. Vehicle.
5. Road laws:
    a. Current laws.
    b. Compliance/non compliance.
6. Getting your Ls and Ps:
    a. Process in the ACT.
    b. Importance of practice.

This module is very comprehensive and it would appear that many elements of CRM are already taught. An analysis of the Road Ready classroom course material was carried out to ascertain to what extent certain principles of CRM are already covered. The analysis is arranged under headings, which correspond to the team-based activities identified in Chapter 5 of this report. The CRM principles are generic principles developed by the authors on the basis of the CRM literature reviewed previously. However, the analysis was based upon the authors' subjective judgement and, as such, a more exhaustive analysis, which utilises defined CRM principles and methods, is recommended as part of further research.

Allocate tasks to drivers and passengers

CRM principles currently covered:

- Issue of passengers assisting with workload in the context of raising awareness of the complexity of driving (Module 4, Activity 1).
- Social influences on driving, including the effects of passengers and peer group influence (Module 4, Activity 3 – optional).
- Issue of passenger influences (especially friends), highlighting as problematic distraction from passengers. Mention of passenger co-driver role (i.e. not distracting, scanning for unexpected hazards) (Module 7, Activity 1 – Review of "Kid Brother" video).
- Trip planning in the context of building in safety (e.g. designated driver, assertiveness) (Module 10, Activity 2).

CRM principles currently not covered:

- How the teamwork concept applies to driving and the benefits of teamwork.
- How to recognise the situations in which teamwork could be utilised.
- How to communicate about passenger roles.

Ensure the driver is fit to drive

CRM principles currently covered:

- Effect of drugs on driving; calculation of blood alcohol concentration (BAC) (Module 8, Activity 1; Module 9, Activities 1 and 2).
- Raising awareness of driver limitations (Module 3, Activity 1).
- Raising awareness of own abilities and the importance of developing a realistic view (Module 3, Activity 4).
- Complexity of driving, the difficulty of multi-tasking and the effect of high workload on driver performance (Module 4, Activity 1).
- Physical, social, emotional, and spiritual factors that can affect driving, including fatigue (Module 4, Activity 3 – optional).
- Raising awareness of the ways in which to decrease risk in potentially unsafe situations, such as by not driving when it is not appropriate (Module 5, Activity 1).
- Dilemmas regarding being unfit to drive (e.g. whether to continue driving when tired, whether to squeeze in extra passengers) (Module 5, Activity 2).

CRM principles currently not covered:

- Passenger's role in ensuring the driver is fit to drive.
- How to communicate appropriately and effectively.

Ensure the driver drives safely

CRM principles currently covered:

- Safe and unsafe driving practices (Module 1, Activity 2).
- Causes of crashes and solutions for avoiding crashes (Module 3, Activity 2).
- Role of human, environmental and vehicle factors in crashes. Emphasis on the importance of adjusting driving to the conditions (Module 3, Activity 3).
- Raising awareness of driver limitations (Module 3, Activity 1).
- Issue of asking for assistance with workload (Module 4, Activity 1).
- Factors that influence driving performance (Module 4, Activity 3 – optional).
- Charting new skill development (Module 4, Activity 4 – optional).
- Types of risks and reasons for risk taking (Module 5, Activity 1).
- Consequences of risk taking (Module 5, Activity 2).
- Causes of the crash in the "Kid Brother" video. Raises issue of how a passenger could assist the driver and also the risk posed by friends as passengers (Module 7, Activity 1).
- Estimating following distance (Module 7, Activity 3).
- Stopping distances and impacts (Module 7, Activity 6).
- Physics of road crashes (Module 7, Activity 7).
- Factors that influence decision-making and strategies for counteracting these influences (Module 10, Activity 1).
- Decision-making in the context of the "Melanie's Story" video (Module 10, Activity 2).
- Decisions concerning risk taking and strategies for choosing safe options (Module 10, Activity 3).
- Mismatch between thoughts, words, actions and choosing safe alternatives (Module 10, Activity 4).
- Solutions to "what if" situations (Module 10, Activity 5).

CRM principles currently not covered:

- Monitoring own performance.
- Monitoring the driver's performance.
- How to provide and receive feedback.
- How to communicate appropriately and effectively.
- How to be assertive.
- Problem solving.

Ensure hazards are detected and appropriate action is taken

CRM principles currently covered:

- Importance of early detection and anticipation of hazards (Module 6, Activity 1).
- Identifying hazards in a video-taped driving scene (Module 6, Activity 2).

CRM principles currently not covered:

- Passenger's role in detecting hazards.
- Monitoring own performance.
- Monitoring the driver's performance.
- How to communicating appropriately and effectively.
- How to be assertive.
- How to provide and receive feedback.

In summary, it is the opinion of the authors that the Road Ready classroom course provides an excellent platform for CRM training. Despite the limitations of the analysis, it is clear that elements of CRM training are already covered within the Road Ready classroom course. However, there are a number of important CRM principles that are not currently covered. For example, a crucial component of CRM training programs is the emphasis on co-ordination among team members and it is this aspect of CRM that is not covered in the Road Ready classroom course. This includes team members recognising the importance of teamwork and the situations where it could be utilised, being aware of each other's roles, monitoring each other's performance, and communicating appropriately and effectively to co-ordinate their efforts to enhance safety.

4.3 Learner Module

The Learner module is designed for young people who possess their Learner Licence. The emphasis is entirely on driving practice, and it is recommended that learner drivers gain at least 50 hours of driving experience across a range of road environments and driving conditions prior to obtaining their Provisional Licence.

There are two mechanisms available to learner drivers in the ACT for obtaining a Provisional Licence. The first, known as Competency Based Training and Assessment (CBTA), involves enlisting an Accredited Driving Instructor who assesses the learner driver on the required 22 driving competencies continuously during the learner period. The second option is available to learners who choose to learn and practice the 22 driving competencies during the learner period without continuous assessment. At the appropriate time, the learner is tested by a Government Licenced Examiner to ensure that the required competencies have been achieved to an acceptable standard.

Other than professional driving instructors, family and friends who are experienced drivers (e.g. parents) can play an important role during the learner period by helping to provide the learner with supervised driving practice. Guides and booklets are available to assist individuals who take on a supervisory role, for example, "Supervising a learner driver", "Learning through practice", and "Towards your P's in the ACT".

It is apparent that there could be scope for including CRM training within this module. As the supervisors are encouraged to use guides and booklets in order to assist their learner driver to learn and practice the required competencies, it may be fruitful to incorporate CRM training principles within these guides in order to facilitate CRM learning. In this way supervisors could assist young drivers to identify situations where CRM might be useful. Moreover, through gaining an understanding of CRM principles, supervisors could encourage practice of CRM while their learner is driving or indeed while driving themselves and their learner driver is a passenger. Professional driving instructors could also assist in CRM training. It is recommended that the potential inclusion of CRM training within the Learner module as a further avenue through which to impart CRM training is investigated once initial CRM training interventions within other Road Ready modules have proved successful.

4.4 Solo Driver Road Ready Plus Course

The Road Ready Plus course is available to provisional drivers aged 17 to 25 years who have held their Provisional Licence for at least six months. Participation in Road Ready Plus is voluntary, however successful completion entitles participants to remove their "P plates" earlier than those who do not participate in the course and to receive an increased limit in the number of driving demerit points allowed.

The course has several aims: to reduce high risk behaviour, increase hazard recognition skill, raise awareness of the complexities of driving, reinforce the consequences of motor vehicle crashes, raise awareness of limitations due to amount of driving experience, encourage a responsible driving manner, and reinforce knowledge of the legal consequences of undesirable driving behaviours.

The course comprises two-hours of individual pre-workshop research activities and three hours of formal learning activities carried out in a workshop with other members of the group. There are nine pre-workshop activities divided into two groups. Participants must choose two activities, one from each group, to complete prior to attending their workshop. At the workshop, pre-workshop activities are reviewed and discussed. In turn, a further five activities, including one optional activity, are carried out as part of the workshop. A brief description of each of the 14 activities is given below:

- Pre-workshop individual activities – Group 1:
    - Activity A – Interview three drivers – Involves the participant interviewing three drivers known to him/her to discuss their experiences as a driver and any advice they can offer to new drivers.
    - Activity B – Search web sites on young driver crashes – The participant must find and document five web sites or sources of information pertaining to young driver crashes that they would recommend to their peers to visit.
    - Activity C – Investigate motor vehicle insurance for young people – The participant contacts a minimum of two insurance companies to research the policies available to young drivers.

- Activity D – Conduct two vehicle inspections – Using a modified NRMA-formatted inspection sheet, the participant is required to inspect the vehicle that he/she drives the most often in addition to one other in which he/she travels as a passenger.

- Pre-workshop individual activities – Group 2:
  - Activity E – Keep a log – Over a one week period, the participant is required to keep a log of the behaviour of drivers in other vehicles who are observed to be committing a traffic infringement or dangerous and uncourteous driving behaviours. Examples of courteous and outstanding driving should also be recorded.
  - Activity F – Visit a wrecker – The participant must visit a wrecker and photograph or sketch three vehicles damaged in a motor vehicle crash. The participant must note the location and extent of the damage, and must comment on the possible cause of the damage.
  - Activity G – Design a poster – The participant is required to design a poster, which he/she feels will best convey the key message of Road Ready to a new driver in his/her peer group.
  - Activity H – Create a 30 second television advertisement – The participant either prepares a storyboard sketch or a video of the advertisement, which he/she feels will best convey the key message of Road Ready to a new driver in his/her peer group.
  - Activity I – Design a web page – The participant is required to design a web site for the Road Ready Plus course that he/she feels would be attractive to his/her peers.
- Workshop group activities:
  - Activity J – What if? – Participants view video segments of driving scenarios and discuss potential hazards, and the potential risks associated with internal, external and multiple events. Participants discuss strategies to reduce risk in these scenarios.
  - Activity K – Who, what, when and how? – In essence, participants discuss the rate of occurrence and type of crashes involving young novice drivers along with reasons behind the crashes.
  - Activity L – ACT road maze – This exercise is designed to demonstrate the effects of driver distraction. Each participant is required to accurately trace the route on a road map maze while the workshop facilitator introduces time pressures and various distractions (e.g. interrupt participants with questions). Participants must then discuss the impacts of distraction on their driving performance and possible strategies for dealing with distractions.
  - Activity M (optional) – Interviews with young drivers – Participants view video segments of certain young people discussing their driving experiences. Participants then discuss their perception of safe and "good" driving, and the consequences of peer influence.
  - Activity N – So, what's the risk? – Participants identify and discuss the conditions and circumstances under which they have taken risks while driving since they obtained their Provisional Licence. Participants also discuss the consequences of risk taking while driving and identify strategies for reducing risk.

The workshop ends with a review of the key outcomes of the course, with participants highlighting those aspects which they found the most useful. Moreover, participants are asked to document what they have learnt from the course and their plans for translating what they have learnt into better driving.

The Road Ready Plus course provides, in the opinion of the authors, an excellent platform for formal CRM training. The course aims to raise awareness of safety, promote decision-making skills, encourage reflection on motivations that influence driving behaviour, and promote safe driving. However, as with the Road Ready classroom course, consideration should be given to including specific CRM training in understanding the interactions between drivers and passengers, exploring the teamwork concept in driving, and how to communicate effectively and appropriately to enhance safety. Pre-workshop activities, for example, could be developed that focus explicitly on CRM training. The Road Ready Plus course is also a suitable candidate for imparting CRM training as at this point the participants have had some experience of driving in the real world and would therefore be in a position to relate the CRM training to their own personal experiences.

4.5 Summary

Current young driver training in the ACT is delivered through the Road Ready program, which involves four components: the Pre-Learner module, the Road Ready classroom module, the Learner module and the Solo Driver module. Review of these training modules indicated that there are a number of underlying similarities between existing training and CRM training principles. As such, it is reasonable to conclude that elements of CRM training are already embedded within existing Road Ready modules. However, the analysis also indicated that a number of critical elements of CRM training are not covered, and, critically, these centred on drivers and passengers learning when and how to co-ordinate efforts to enhance safety. The following CRM principles were identified (based on the authors' subjective judgement) as currently not covered in the Road Ready classroom course:

- how the teamwork concept applies to driving and the benefits of teamwork;
- how to recognise the situations in which teamwork could be utilised;
- passenger's role in particular situations;
- how to communicate about passenger roles;
- how to communicate appropriately and effectively;
- how to provide and receive feedback;
- how to be assertive;
- monitoring own performance;
- monitoring the driver's performance; and
- problem solving.

Serious consideration, therefore, should be given to incorporating CRM training into current young driver training in the ACT. Further, the Road Ready classroom and Solo Driver Road Ready Plus programs appear to offer the most suitable avenues for formal CRM training delivery.

As part of future program iterations, the Learner module could be investigated as a further avenue through which to introduce, practice and reinforce elements of the training.

Chapter 5 Investigating the Application of CRM Training in Young Driver Training

In the previous chapter, scope for incorporating CRM training into current young driver training in the ACT was explored. The next phase of the research involved investigating the potential content and delivery of CRM training applications within young driver training. Our investigations centred on the following three key tasks:

1. Identification of the key differences between driving and aviation. Distinct differences exist between the driving and aviation domains that would affect the content and delivery of CRM training to young drivers. In order to embark on the design of a novel driver CRM training program, a break down of the key differences between the driving and aviation domains was required.
2. Identification of team-based activities within the driving domain. CRM training programs focus upon the development of team competencies required for effective task performance. In order to determine the potential content and delivery of a young driver CRM training program, a break down of the team-based activities involved in the driving task and the KSAs required to perform the activities is required.
3. Analysis of contemporary CRM training techniques and identification of potential techniques for driver CRM training delivery. In order to gain a deeper understanding of contemporary CRM training programs and delivery techniques, and to identify potential CRM training techniques for the driving domain, consultation with CRM experts from other domains was required.

The current chapter describes the research involved during the completion of each of the three tasks identified above.

5.1 Differences Between Driving and Aviation

CRM training in other domains is delivered to employees in an organisational context. Although some drivers are employees whose main occupation is driving, individuals undertake most of their driving for private purposes. Even professional drivers also drive as private individuals. The different context of driving has implications for how CRM training might be adapted to this domain. The main differences between driving and the aviation domain are summarised below and the implications for driver CRM training are articulated:

1. Drivers have not all received the same training. In other domains professional groups have usually progressed through a standardised training syllabus and so share a common understanding of procedures. This was not the case in the early development of CRM training when there were many pilots who had flown for their whole careers without receiving CRM training. It was often difficult for younger pilots to act according to their training when others did not have the same understanding of the reasons for those actions. Having drivers who have not had a similar level of training is similar. Until there is a significant proportion of the

population who have received this training, it will be difficult for drivers and passengers to have a common understanding and acceptance of the behaviours which CRM promotes.

2. Pilots have a common culture, especially in relation to safety and this is reinforced by the organisational culture. The expectation from the organisation is that passenger comfort and safety will be the paramount concerns for pilots. Pilots therefore expect their peers to have the same orientation to their work as they themselves do.
3. Pilots have been selected to fulfill certain criteria and are therefore likely to be more similar to each other physically and psychologically than are drivers. People with poor attitudes to safety are therefore screened out and pilots have an expectation that their peers will share the same values and have the same level of skill as they do. In driving, this is not the case. Drivers will differ in their skill level and desire to take risks and goals for driving, all of which create a wide range of attitudes to safety. This implies that CRM training for driving needs to emphasise differences between drivers and therefore the need for passengers to monitor and potentially react to very idiosyncratic aspects in their driver's performance.
4. Unlike the aviation domain, within the driving domain there is no explicit requirement for team coordination. A pilot's job is structured around the need for teamwork and people's roles are defined by their position in the team. Sanctions can also be applied when performance is poor. Although a pilot can be more or less skilled in coordinating with team members, the expectation that teamwork is required is acknowledged. In driving, no formal recognition of the team concept and team roles currently exists. *This implies that CRM training for drivers must incorporate a component that explains the need for drivers and passengers to work as a team and shows how teamwork can improve safety.*
5. In commercial aviation, teamwork is always required, but in driving not only do people often drive by themselves, there are many situations in which teamwork is not required because the conditions do not warrant it. However, in poor weather, at night, when workload is high or hazards are present teamwork could be helpful. Because of this characteristic of driving, a component of the training should be to *recognise situations* in which teamwork is relevant and helpful.
6. In driving the team is often characterised by social rather than professional relationships. There are therefore no formal lines of authority and safe performance standards need to be negotiated by drivers and passengers. This is likely to require a considerable amount of skill because of the subtle constraints imposed on communication between people by social mores.
7. In aviation, CRM is constantly reinforced through recurrent training programs. In driving training is likely to occur once and therefore the benefits are likely to diminish over time. This is not a problem unique to CRM training. Others have noted this in relation to driver training in general (Senserrick & Morrison, 2003). However, it is worth reiterating that the benefits of innovative driver training programs will only be fully realised with recurrent training.

In summary, it is apparent that there are a number of distinct differences between the driving and aviation domains that will affect the content and delivery of a driver CRM training program. The differences between the two domains identified above have the following implications for driver CRM training:

- Driver CRM training should emphasise the potential differences between drivers (such as skill levels and risk taking behaviour).

- Driver CRM training should emphasise the safety benefits associated with passengers monitoring driver performance.
- Driver CRM training should include a component that highlights the importance of teamwork within the driving domain, the benefits of drivers and passengers working as a team and the potential road safety improvements resulting from effective teamwork in driving.
- Driver CRM training should teach drivers and passengers to effectively recognize situations in which teamwork is required.
- Driver CRM training should develop skills for negotiating safe performance standards within driving teams.
- The benefits of driver CRM training will only be realised with recurrent training.
- The benefits of driver CRM training will only be fully realised if a significant proportion of the driving population receives the training.

5.2 Identification of the KSAs required to Perform Team-Based Driving Activities

According to Salas and Cannon-Bowers (1997), for team training to be effective, an understanding of the nature of team performance is required. In particular, Salas and Cannon-Bowers (1997) suggest that an understanding of the KSAs that a team must possess for effective performance is required, and that team training interventions should be designed on the basis of the KSAs identified. Following Salas and Cannon-Bowers (1997), an analysis of the team-based activities required during driving and the KSAs required to carry out those activities was conducted. Salas and Canon-Bowers (1997) recommend that these be used to develop the instructional method, scenario design and performance assessment and feedback tools. However, such a detailed analysis was beyond the scope of the present project. In order to identify the key KSAs required during team-based activities, the following procedure was adopted:

1. Review of aviation training literature. Initially a review of the aviation training literature was undertaken in order to identify those KSAs trained in the aviation domain that relate to the driving task.
2. Review of relevant young driver crash literature. A review of various sources of crash literature was undertaken in order to identify any team-based factors which were implicated in young driver crashes which occurred in the presence of passengers.
3. Development of KSAs. On the basis of the two tasks above, an initial list of examples of team-based activities and the KSAs required to perform them during the driving task was created. This was based upon the subjective judgement of the authors, and may not be definitive at this stage.

The examples of team-based activities and the KSAs required in driving are presented in Table 5.1. The list in Table 5.1 is not definitive, and further research is needed in order to comprehensively identify the team-based activities and the KSAs involved during the driving task. Nevertheless, it acts as a useful set of guidelines with respect to where initial driver CRM training should focus and serves to pinpoint where there is the greatest need and the greatest potential for reducing fatalities and serious injuries through the provision of CRM training.

Table 5.1 Team-based activities for driving and corresponding KSAs

Team-based activities	Knowledge	Skills	Attitudes
Allocate tasks to the driver and passengers.	How the team concept is applicable to driving. Possible passenger roles. Helpful and unhelpful passenger influences. Implicit and explicit passenger influences. Designate driver and delineate responsibilities and expectations e.g. no alcohol.	Ability to ask for assistance when overloaded. Ability to offer assistance if driver overloaded. Ability to recognize situations in which teamwork is important e.g. long trip, night, wet road. Ability to gather and integrate information. Ability to identify alternatives. Ability to select best solution. Ability to recognise own limitations as a driver and those of other drivers	Belief in the value of teamwork. Positive attitude to passenger roles. Awareness of own limitations as a driver (can acknowledge need for assistance).

Note. Items listed in each of the KSA columns are not intended to directly match up with same row items in adjacent KSA columns

Table 5.1 (cont.) Team-based activities for driving and corresponding KSAs

Team-based activities	Knowledge	Skills	Attitudes
Ensure the driver is fit to drive.	Identify how individual factors affect driver performance: • age; • experience; • alcohol/drugs; • fatigue; and • number and type of passengers.	Ability to recognize own limitations as a driver and those of other drivers. Ability to monitor driver's task performance. Ability to accept constructive advice. Ability to offer constructive advice. Ability to communicate appropriately and effectively. Ability to resolve conflicts. Ability to jointly solve problems. Ability to gather and integrate information. Ability to identify alternatives. Ability to select best solution.	Awareness of limitations of drivers. Awareness of own limitations as a driver. Belief in desirability of passenger responsibility.

Note. Items listed in each of the KSA columns are not intended to directly match up with same row items in adjacent KSA columns

Table 5.1 (cont.) Team-based activities for driving and corresponding KSAs

Team-based activities	Knowledge	Skills	Attitudes
Ensure the driver drives safely.	Identify risky driving behaviour, for example • speed; • poor signaling; • travelling too close to the vehicle in front; • running red lights; • not concentrating fully on driving; and • violation of road laws.	Observation Scanning Ability to recognize own limitations as a driver and those of other drivers. Ability to monitor driver's task performance. Ability to accept constructive advice. Ability to offer constructive advice. Ability to communicate appropriately and effectively. Ability to resolve conflicts. Ability to jointly solve problems.	Awareness of limitations of drivers. Awareness of own limitations as a driver. Awareness of risks. Belief in desirability of passenger responsibility. Positive attitude to passenger advice.

Note. Items listed in each of the KSA columns are not intended to directly match up with same row items in adjacent KSA columns

Table 5.1 (cont.) Team-based activities for driving and corresponding KSAs

Team-based activities	Knowledge	Skills	Attitudes
Ensure hazards are detected and appropriate action is taken.	Identify hazards in the environment, for example: • pedestrians; • trams; • turning vehicles; • overtaking; • weather; • low visibility; and • knowledge of appropriate action.	Ability to perceive hazards. Ability to assess the risk posed by hazards. Ability to anticipate how situation will evolve. Ability to recognize own limitations a driver and those of other drivers. Ability to monitor driver's task performance. Ability to accept constructive advice. Ability to offer constructive advice. Ability to communicate appropriately and effectively. Ability to resolve conflicts. Ability to jointly solve problems. Ability to gather and integrate information. Ability to identify alternatives. Ability to select best solution.	Awareness of limitations of drivers. Awareness of own limitations as a driver. Positive attitude to passenger role.

Note. Items listed in each of the KSA columns are not intended to directly match up with same row items in adjacent KSA columns

5.3 Consultation with Experts in CRM Training

5.3.1 Aviation

A workshop was held on June 9th, 2004 at the offices of Dédale Asia-Pacific. Dédale-Asia Pacific is a consulting group that specialises, among other things, in the design, delivery and evaluation of CRM training programs for major commercial airlines, including Qantas and Singapore Airlines. Present were two staff members from Dédale who are experienced in developing CRM training programs for airlines, and three members of the project team from MUARC (Janet Anderson, Eve Mitsopoulos, and Michael Regan). The aims of the workshop were to gain input from the Dédale team on three issues:

- the key team-based activities in the driving domain derived previously;
- the previously derived KSAs required to complete these activities; and
- proposed techniques for team training in driving

The Dédale team suggested that the introduction of CRM techniques into driver training programs could be viewed as a similar process to introducing these techniques in pilot training. The emphasis in this project on incorporating CRM techniques into existing driver training programs is analogous to the original introduction of some CRM components into pilot training. As noted earlier in this report, it has taken years, and the development of different generations of CRM training programs, for CRM training to be fully incorporated into recurrent pilot training. There are several reasons for this, including the need for a change in the culture of aviation, which occurred as older pilots retired and were replaced by younger pilots who were exposed to CRM ideas from the start of their careers.

A comprehensive CRM training program for drivers based on the KSAs for each of the team-based activities identified in Section 5.2 would be lengthy and would necessarily involve redesigning existing driver training programs. Therefore, it was recommended that the benefits of the CRM training for young drivers could be maximised in the short term by concentrating initially on the critical situations that would benefit most from team training. These were identified as follows:

- driving when unfit to drive due to alcohol and drug intoxication;
- deliberate or unintentional risk taking; and
- failure to perceive a hazard and take corrective action.

In these three situations *communication* between passengers and drivers was identified as the key to mitigating the risks. Passengers need to negotiate effectively with a driver who is unfit to drive or who is taking risks, and they need to be *assertive* enough to influence the driver's decisions and actions. They also need to monitor driver performance and draw attention to hazards that might have been missed. In all these cases the ability to communicate effectively and *give* and *receive* constructive feedback is essential. Therefore the aims of the training would be to educate young drivers and passengers on the importance of teamwork within the driving domain, the importance of monitoring driver performance, the importance of providing and receiving constructive

feedback, and to increase participants' ability to communicate appropriately in the three situations identified above that represent typical threats to the safety of young drivers and passengers. The passenger is viewed in this way as a "defence" against the possibility of a crash.

The workshop also provided specific information about techniques that might be useful for driver training and these are discussed in Section 5.4.

5.3.2 Medicine

Two members of the project team (Janet Anderson and Eve Mitsopoulos) also visited the Southern Health Simulation Centre based at the Moorabbin campus of Monash Medical Centre. A simulated operation was observed in which trainees were required to deal with an anaesthesia crisis. The scenarios were videotaped and participants then discussed the actions taken by all the participants while watching the videotape. Discussions were held with several staff members. As previously discussed, CRM training in medicine has evolved differently to that in aviation. The training emphasises managing crises and developing behavioural repertoires to respond to crises. Although this involves mobilising team resources, there appears to be less emphasis on team coordination than in other domains. Consequently, there appeared to be few techniques that were directly applicable to training young drivers.

However, several general techniques that are used for training medical specialists were discussed and these were more relevant. The techniques include the use of videotaped communication sequences which are then critiqued and discussed, video games to demonstrate the importance of team work and the effect of attentional tunnelling and the use of role plays to act out the ending to a scenario seen acted on videotape. This last technique is used to train clinicians to deal with medical errors. The videotaped sequence shows the unfolding of the error and the consequences. The trainees are then required to act out the end of the scenario in which the error is explained to the patients. These techniques will be discussed further in Section 5.4.

5.3.3 Conclusions

The process of consultation with CRM experts was extremely useful in helping the project team to identify the critical tasks that should be targeted in CRM for driver training:

1. driving when unfit to drive due to alcohol and drug intoxication;
2. deliberate or unintentional risk taking; and
3. failure to perceive a hazard and take corrective action.

Young driver training programs already cover the knowledge component of these tasks and practice is provided in perceiving hazards and taking corrective action when young people are learning vehicle-handling skills. It emerged that the key component to successfully completing the tasks as a member of a *team* is communication skill. Therefore, it was considered that the focus of CRM training for drivers should initially be on how to communicate to achieve the critical team-based activities. Scenarios for training communication skills can be derived from the tasks. For example, a scenario in which a driver is impaired by alcohol can be used to practice communication. Particular training techniques are discussed in section 5.4.

5.4 Potential Driver CRM Training Programs

Following consultation with the CRM training experts it was decided that the emphasis of CRM training for young drivers should be placed on communication skills. It was agreed that the training should focus initially on communication skills required to achieve the following three team-based activities:

- ensuring the driver is fit to drive;
- ensuring the driver drives safely; and
- ensuring hazards are detected and appropriate action taken.

In line with the philosophy of CRM training, it is envisaged that knowledge would be imparted in a lecture or similar, skills would be practised and participants would receive feedback on their performance.

It is recommended that a communication technique used in aviation could form the basis of the skills training. The "support process" (Ansett Australia) is used when there are safety concerns. The process is designed to address problems before safety becomes compromised. The general idea is that communication proceeds through stages of increasing urgency. The next stage is only invoked if there is no satisfactory response at the earlier stage. There are three phases of the support process: the *guidance* phase, in which information is relayed; the *procedural* phase, in which a proposed action is stated; and the *emergency* statement in which it is stated that action must be taken. In the first phase the aim is to increase the flow of information and facilitate communication. Communication can take the form of an observation about the operations, an inquiry about operations or an expression of concern about operations. An example from driving will help to explain this process. If the driver is exceeding the speed limit, the passenger might say "The speed limit is xxx here", or ask "What is the speed limit here?", or "How fast are we going?", or say "I am concerned that we are going a bit too fast".

If an unsatisfactory response is received, the next stage of communication is *procedural*. In this stage a solution to the problem is proposed. There are two parts to the communication, the proposed action and the consequences if the action is not implemented. Using the driving example, the passenger would say, "Slow down or we will crash" or "Slow down or we will be booked".

If an unsatisfactory response is again received, the *emergency* statement is used. This stage should only rarely be necessary. It involves a statement that action must now be taken and a reiteration of the action to be taken. In the driving example, the passenger would say "Slow down now". Insufficient response to this statement could be viewed as evidence of gross recklessness and it is recommended that action be taken to stop it. The exact nature of recommended actions for the driving domain remains unclear. For example, in the aviation domain one possible actions would be to take over control from that person. Of course this is not a viable option in the driving domain and would be highly dangerous. Possible alternative actions in the driving domain would be positive communication designed to reduce or remove the gross recklessness. It is apparent that further research into the application of the "support process" within the driving domain is required.

5.5 Potential Training Techniques

In this section possible techniques for training the communication skills discussed in the previous section are discussed. The acceptability of these techniques for young people and their trainers was assessed in the next phase of the research (see Chapter 6).

5.5.1 Lecture

A lecture in communication skills lecture would include:

- a description of aggressive, assertive, supportive and submissive communication styles;
- a discussion of the positive and negative aspects of these communication styles; and
- a discussion of the "support process" (described above) and other appropriate strategies for communication when safety is compromised.

5.5.2 Role-Play

The "support process" and other appropriate communication strategies could be practised using role-plays in which the strategies are used. The scenarios should include the three situations that were identified as most important for young drivers: dealing with an unfit driver, ensuring the driver is driving safely, and ensuring that hazards are detected. As noted in the literature review, it has been reported that acceptance of role-plays is low and, as such, there is a need to assess the acceptability of the technique for young people. Conducting the role-play in small groups of two to three people might increase acceptability, although this might also decrease the effectiveness of any feedback.

5.5.3 Video

The "support process" and other appropriate communication strategies could also be demonstrated on video and the group could engage in discussion about it. Different types of communication could be shown and critiqued for effectiveness by the group. Discussion could occur at the end of the video or the video could be stopped at strategic points in the sequence to allow discussion to occur.

5.5.4 Video Games

Video games that demonstrate the importance of teamwork may be useful for CRM training. For example, in one game a task has to be completed, but this can only be achieved by the participants working as a team. This could be a powerful demonstration of the idea that teamwork is important.

5.6 Summary

The analysis of existing young driver training programs in the ACT indicates that the main emphasis of young driver CRM training should be upon the communication skills required to achieve the following three critical tasks:

1. ensuring the driver is fit to drive;
2. ensuring the driver drives safely; and
3. ensuring hazards are detected and appropriate action taken.

Further, possible training techniques for young driver CRM training were identified. These include lectures, role-plays, video demonstrations followed by group discussion, and video games which can only be completed successfully if all players work as a team.

Chapter 6 Focus Groups

6.1 Introduction

Six focus groups were conducted to gather information on individuals' perceptions of team training for young drivers and young passengers. Specifically, the aims of the focus groups were to examine whether young drivers and passengers report experiences indicative of a need for team training, and to assess reactions to the proposed content of, and methods for delivering, the team training.

Earlier phases of the project identified the Road Ready classroom course and the Road Ready Plus course as potential avenues through which to impart appropriate team training. Accordingly, individuals from the following four target groups were sought to serve as participants in the focus groups:

1. pre-learner and learner drivers aged between 15 and 17 years who are currently undertaking, or who have completed within the last year, the Road Ready classroom course;
2. teachers of the Road Ready Year 10 program at their High School;
3. Provisional Licence holders who are at least six months into their Provisional Driver's Licence and who have recently participated in the Road Ready Plus course; and
4. facilitators of the Road Ready Plus course.

Comparing and contrasting the views of the pre-learner/learner drivers with those of the provisional drivers, who critically will have obtained some on-road driving experience, serves to provide some insight into the need, form and extent of team training from a developmental viewpoint. Involving teachers and facilitators serves to further explore the suitability and practicalities of incorporating team training into the current ACT road safety education and training framework given their experiences in delivering the current programs.

The current chapter provides an outline of the focus group method followed by presentation of the focus group findings.

6.2 Method

6.2.1 Participants

Six focus groups were conducted with a total of 39 participants. Each participant was involved in a single focus group only. Each group comprised between 4 and 10 participants.

Two focus groups were held with pre-learner and learner drivers who were currently undertaking the Road Ready classroom course, or who had completed it within the last year. A total of 19 participants, 14 female and five male, attended. Each of the two groups contained both males and females. The average age was 16.1 years (SD = 0.4 years). Five participants had completed approximately half of the Road Ready classroom course, while the remaining 14 had completed it within the preceding eight months (mean = 4.4 months, SD = 2.8 months). Of those who had

completed the course, nine had obtained their Learner Licences within the preceding eight months (mean = 5.4 months, SD = 2.4 months). Three participants completed the program through the private provider and the remaining 16 completed the course as part of the Year 10 curriculum at their High School.

Two focus groups were also held with provisional drivers who had undertaken the Road Ready Plus course. Twelve participants, eight males and four females, attended the two groups. One group comprised males only, and the second group contained an equal number of males and females. Across participants, the average age was 20.3 years (SD = 1.7 years). The average age at which the participants obtained their Provisional Driver's Licence was 18.1 years (SD = 1.4 years). Accordingly, at the time of the focus groups, participants had held a Provisional Licence for an average of 2.3 years (SD = 0.8 years). Participants had undertaken the Road Ready Plus course within the preceding 2.8 years (mean = 1.4 years, SD = 0.9 years) and within 18 months of obtaining their Provisional Licence (mean = 10.6 months, SD = 5.0 months).

A single focus group was held with teachers of the Year 10 Road Ready classroom course. Four teachers, two male and two female, participated. Their average age was 43.5 years (SD = 9.8 years), and they had an average of 2.3 years experience (SD = 0.8 years) in teaching the program.

The sixth focus group involved facilitators of the Road Ready Plus course. Four facilitators, one female and three males, attended. Their average age was 44.7 years (SD = 12.5 years), and they had been facilitating the course for an average of two years (SD = 1.3 years).

Participants were recruited through various means. Participants in the pre-learner/learner driver groups had responded either to recruitment materials distributed to year 10 students at a number of high schools in the ACT, or to posters displayed at the ACT Motor Vehicle Registry Office and at ACT Government Shopfronts.

Participants in the provisional driver groups had responded either to recruitment materials distributed to attendees of several Road Ready Plus workshops, or to advertisements posted with the student employment services of the Australian National University, University of Canberra and Canberra Institute of Technology.

Attendees at the focus group for Road Ready Plus facilitators had responded to recruitment notices distributed to all facilitators of the program. Participants at the focus group for teachers of the Year 10 Road Ready classroom course were those who were invited to attend by the Road Ready Manager at the ACT Department of Education and Training and who were willing and available to take part.

All participants provided written informed consent prior to taking part in their focus group. Participants under 18 years of age also provided written consent from their parent or guardian.

6.2.2 Materials

Questionnaire

A questionnaire was developed and administered to each participant at the focus groups. The questionnaire content varied, however, depending on the target group to which the questionnaire was administered. See Appendix A for a copy of the questionnaires.

The teacher and facilitator questionnaires were designed to gather some basic demographic information about the teachers and facilitators in the focus group sample in addition to some information about the number of years they had spent so far in delivering their respective programs.

The pre-learner/learner driver and provisional driver questionnaires had multiple purposes. The first was to obtain some basic demographic information about participants. The second purpose was to ascertain, in the case of the pre-learner and learner drivers, whether, when and where they had completed the Road Ready classroom course and, for those participants who had, whether and when they had obtained their Learner Licence. The corresponding questions in the provisional driver questionnaire served to determine participants' driving experience and when they had undertaken the Road Ready Plus course.

The third purpose of the questionnaires administered to participants in the pre-learner/learner driver group and the provisional driver group was to gather information on participants' experiences and reactions as a passenger in candidate situations where their driver's actions had made them feel unsafe. Provisional drivers, in a subsequent section, were also asked questions concerning their experiences as a driver (in the same candidate situations as in the questions on experiences as a passenger) where their passenger had expressed feelings of compromised safety.

All questionnaires were completed anonymously.

Discussion guide

A list of open-ended questions was developed to guide each of the focus group discussions. There was slight variation across discussion guides depending on the target group. In particular, in addressing the questions, teachers and facilitators were asked to think about the age group and experiences of the people to whom they deliver their respective programs. A copy of each of the discussion guides can be found in Appendix B.

The key issues covered in the guides were as follows:

- thoughts on young drivers and passengers working as a team to achieve certain safety oriented tasks and examples of situations where young drivers and passengers could work as a team to avoid crashes;
- thoughts on the potential usefulness and effectiveness of training young drivers and passengers in how to communicate effectively with one another to achieve certain tasks and thoughts on any barriers to successfully delivering the training;
- thoughts on teaching/training techniques currently used in the Road Ready classroom and Road Ready Plus programs in terms of which ones appear to be most effective/least effective and most pleasing/least pleasing to program participants; and
- thoughts on the potential effectiveness of, and satisfaction with, several methods/techniques which could be used to impart team training in communication, namely:
    - lectures;
    - role-plays (performed by representatives from the class/group and followed by group discussion versus performance and discussion within small groups of two/three participants);

- video followed by group discussion; and
- video games which can only be won if all team members work effectively as a team.

To facilitate complete and accurate data collection, all focus group discussions were recorded on videotape.

6.2.3 Procedure

To maximize focus group attendance, participants were contacted prior to their focus group to remind them of their engagement. All focus groups were held in the ACT with the majority of the groups held at the Road Ready Centre in either Phillip or Watson. With the exception of the teacher group, all focus groups were held in the evening or on the weekend. The duration of each focus group session was approximately two hours and each session proceeded in the following manner:

- Introduction: Participants were briefed on the background and aims of the project, and on the aims of the focus group discussions.
- Questionnaire: Participants were asked to complete the questionnaire for their target group.
- Guided discussion: The discussion generally followed the format set out in the discussion guide, however, with some variation across groups with respect to the order in which issues were discussed and the formation of any additional questions for discussion. In this way, the facilitator guided the discussion while making little contribution otherwise.
- Final matters: Finally, participants were thanked for their attendance.

A transcription of each focus group discussion was prepared from the video tapes. The aim of this process was to preserve the content of any comments made, rather than to provide a verbatim transcription of each focus group. No names or codes were used in compiling the transcriptions nor in collating the questionnaire data.

6.3 Results

6.3.1 Focus Group Questionnaire

The questionnaire administered to pre-learner/learner and provisional drivers aimed to investigate whether young drivers and passengers, at least in the current sample, report experiences of *ineffective communication* that indicate a need for team training. Experiences were considered in the context of three situations: driving at excessive speeds, driving too close to the vehicle in front, and driving after drinking or using drugs. Pre-learner and learner drivers were asked to report their experiences as passengers, while participants in the provisional driver groups were asked to consider their experiences as a passenger, and in turn, as a driver carrying passengers.

Experiences as a passenger

In the questions about experiences as a passenger, participants were asked whether they had ever felt unsafe because the driver of the car in which they were travelling was driving too fast. In the

next section, participants were asked whether they had felt unsafe because their driver was driving too close to the vehicle in front. Finally, participants were asked whether they had ever felt that they did not want to travel in a particular driver's vehicle because that driver had been drinking or using drugs.

In each case, participants who responded 'yes' were asked to specify the driver's gender and relationship to the passenger (that is, him/herself), and the number, gender and relationship to him/herself of any other passengers present. Participants were also asked whether they took action by saying something to their driver, and if they had, how their driver responded. Where the driver did not respond favourably, participants were asked whether they said anything further to their driver. Finally, participants were asked to comment on their reasons for staying silent in any situations where they had felt unsafe because of their driver's actions but had decided not to say anything.

Driving at excessive speeds

Approximately one-third (six of 19) of participants in the pre-learner/learner group reported having felt unsafe because their driver was driving too fast. In four of these cases, the driver was male; in the others, the driver's gender was not specified or the passenger mentioned several drivers (parents, siblings and friends of both sexes). There was no particular pattern with regards to other passengers in the vehicle at the time; some participants reported no other passengers, some reported mothers, siblings or friends of both genders. Almost all (11 of 12) of the provisional drivers reported feeling unsafe because their driver was going too fast. It is interesting that again, in the majority of these cases (eight of 11), the driver was a male friend of the passenger. Other passengers were in most cases either absent, or friends of either gender.

The questionnaire next asked participants 'What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too fast?' Participants were given several options: a) nothing; b) asked the driver to slow down; c) asked the driver to stop so I could get out; d) commented on the driver's driving (e.g. we're going pretty fast) without asking him/her to slow down; or e) something else, please describe. They were then asked to indicate the driver's response using one of the following options: a) continued to drive at the same speed; b) slowed down; c) increased speed; d) stopped the car so I could get out; or e) something else, please describe. To aid analysis, participants' responses to the question of what they did or said to their driver were categorised as follows: no action ('nothing' response); implicit request ('commented on the driver's driving'); or explicit request ('asked the driver to slow down'/'asked the driver to stop the car so that I could get out'). The final response category, 'something else, please describe' could have been classified as either an implicit or explicit request, depending on the actual response provided.

Similarly, driver's responses were grouped according to whether they resulted in the desired reaction ('slowed down'/'stopped the car so I could get out') or in an undesired reaction ('continued to drive at the same speed'/'increased speed'). Again, depending on the actual response provided, a 'something else, please describe' response could have been categorised as either a desired or undesired reaction.

Table 6.1 shows the number of participants who took no action, issued an implicit request or an explicit request to their driver when they felt unsafe because the driver was driving too fast. The table also shows whether each action resulted in the desired response from the driver, or an

undesired one. Results are shown separately for pre-learner/learner drivers and provisional drivers.

Table 6.1. The number of respondents who took a particular action when they felt unsafe because their driver was driving too fast, and the driver's response, as a function of driver group.

	Driver's initial reaction	
Passenger's initial reaction	Desired response	Undesired response
Pre-learner/Learner drivers (n=6) [a]		
No action [b]	2	
Implicit request	2	1
Explicit request	1	1
Provisional drivers (n=11)		
No action [b]	4	
Implicit request	2	1
Explicit request	3	1

[a] One passenger reported two situations
[b] Driver's response not applicable

From Table 6.1, it can be seen that two of the six pre-learner/learner drivers took no action when they felt unsafe. The most common strategy (used by three participants) was to comment on the driver's speed. This strategy had mixed success: in two cases the driver reacted desirably by slowing down, while in the other case the driver did not, continuing to drive at the same speed. One passenger recalled two situations, with different drivers, where she had requested that the driver slow down. One of the drivers reacted desirably by slowing down, however the other driver did not, choosing instead to continue at the same speed. In the two reported cases where the driver did not respond desirably to the passenger's implied or explicit request, neither passenger made any further comment to the driver.

In the provisional driver group, responses were spread fairly evenly across the three categories of potential actions. Four (of 11) provisional drivers said nothing to their driver. Three reported commenting on the driver's speed (an implicit request), which resulted in the driver responding desirably by reducing speed in two of these cases. Four provisional drivers reported issuing their driver with an explicit request. Two specifically asked the driver to slow down, which was successful in one case; in the other, the driver continued at the same speed and the passenger subsequently requested him to stop. One passenger immediately requested that the driver stop the car so that he could get out, which the driver did; the other used a combination of a comment on speed, a request to slow down, and a demand to let him out of the car, which resulted in the driver slowing down.

Driving too close to the car in front

Only two (of 19) participants in the pre-learner/learner group reported feeling unsafe because the driver was driving too close to the car in front. In one case, the driver was the passenger's brother; in the other, a male friend. Neither case involved other passengers. One-third (four of 12) of the provisional drivers reported feeling unsafe because the driver was driving too close to the car in front. The drivers were friends (of either gender) in every case. Three of the four cases involved other passengers, who again were friends of both genders.

In this section of the questionnaire, participants were asked 'What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too close to the car in front?' The options given were a) nothing (no action); b) asked the driver to back off (explicit request); c) asked the driver to stop so I could get out (explicit request); d) commented on the driver's driving, (e.g. we're pretty close to that car in front) without asking him/her to back off from the car in front (implicit request); or e) something else, please describe (could be categorised as either an implicit or explicit request, depending on the description). Passengers were also asked to report how the driver had responded, with the options a) continued to drive at the same distance from the car in front (undesired response); b) backed off from the car in front (desired response); c) got even closer to the car in front (undesired response); d) stopped the car so I could get out (desired response); or e) something else, please describe (could be classified as either a desired or undesired reaction, depending on the description). As in Table 6.1, the responses in Table 6.2 have been grouped for easy comparison.

Table 6.2. The number of respondents who took a particular action when they felt unsafe because their driver was driving too close to the car in front, and the driver's response, as a function of driving group.

	Driver's initial reaction	
Passenger's initial reaction	Desired response	Undesired response
Pre-learner/Learner drivers (n=2)		
No action [a]	0	
Implicit request	2	0
Explicit request	0	0
Provisional drivers (n=4)		
No action [a]	0	
Implicit request	0	1
Explicit request	3	0

[a] Driver's response not applicable

As shown in Table 6.2, both participants from the pre-learner/learner group reported that they issued an implicit request (i.e. they commented on the distance), resulting in the driver increasing the following distance, as desired. In the provisional drivers group, only one passenger utilised an implicit request; the driver continued at the same distance and the passenger did not say anything else. Three passengers explicitly requested that the driver 'back off', which the driver did.

Driving under the influence of alcohol or drugs

Almost half (eight of 19) of the participants in the pre-learner/learner group reported that they had not wanted to get in a car because the driver had been drinking or using drugs. Other passengers were present in every case. In seven of these cases, the driver and other passengers were friends of the participant. In the final case, the driver was a family friend and the other passengers were the driver's children. In four cases, the driver was male; in one case, female; and in the other three, the participant did not report the driver's gender. Over half (seven of 12) of the provisional drivers reported that they had not wanted to get in a car because the driver had been drinking or using drugs. In one case the driver was a female friend; in every other instance, the driver was a male friend. Three of these situations involved no other passengers; the other four involved passengers who were friends, usually male.

Participants who answered this section of the questionnaire were asked to describe their initial action from the following options: a) said nothing and got into the car anyway (no action); b) refused to/did not get in the car; c) commented on the fact that the driver had been drinking or using drugs and as such was unfit to drive; d) took measures so that the driver would not drive (e.g. kept the keys away from the driver); or e) something else, please describe (other). Participants were then asked whether the driver responded by a) deciding to drive (desired response); b) deciding not to drive (undesired response); or c) doing something else. Responses are summarised in Table 6.3.

Table 6.3 shows that the most common passenger reaction across both driver groups was to make a comment about the driver's unfitness to drive. Four passengers (of eight) in the pre-learner/learner group commented on the driver's unfitness to drive; nevertheless, in each of these cases, the driver decided to drive anyway (an undesired response). Three of these four passengers did not say anything else to the driver, while one asked him to be careful and slow down. Two passengers refused to get into the vehicle with the affected driver. In one of these cases, the driver responded desirably by deciding not to drive; however, in the other case, the driver decided to drive anyway, and the passenger made no further comment. One passenger took no action. Finally, one passenger found somebody who was unaffected by alcohol to drive instead – a desirable outcome.

All of the participants in the provisional group took some action when confronted by a driver who was unfit to drive. Four (of seven) passengers commented on the driver's state, and in three of these cases the driver decided not to drive. In the fourth case, the potential passenger subsequently told the driver 'you're definitely not fit to drive, I'll shout you a cab'. One passenger refused to get in the car, but the driver decided to drive anyway. Another passenger first commented on the driver's state, then refused to get in the car, and then took the keys away so that the driver was unable to drive. Finally, one passenger 'took measures so that the driver did not go over 40 kph', which resulted in the driver driving home very slowly.

Table 6.3. The number of respondents who took a particular action when they felt that they did not want to get into a vehicle with a particular driver because that driver had been drinking or using drugs, and the driver's response, as a function of driver group.

	Driver's initial reaction	
Passenger's initial reaction	Desired response	Undesired response
Pre-learner/Learner drivers (n=8)		
No action [a]	1	
Comment	0	4
Refused to get in car	1	1
Took keys	0	0
Other	1	0
Provisional drivers (n=7)		
No action [a]	0	
Comment	3	1
Refused to get in car	0	1
Took keys	1	0
Other	0	1

[a] Driver's response not applicable

Reasons for staying silent

To end the section in the questionnaire on experiences as a passenger, participants were asked to think about times when they had felt unsafe with a driver but had not done or said anything, and to provide the most and next to most important reasons that made them decide not to do or say anything. Fifteen out of 19 participants in the pre-learner/learner group provided one or two reasons for staying silent. The range of responses from the pre-learner/learner group suggests that they feel that commenting on another's driving is unlikely to have a positive effect, and may even have a negative effect. For example, six (of 19) participants mentioned fear of the driver getting angry or annoyed. Five mentioned their 'need to get home', implying that they were dependent on the driver for transport and felt that they had to accept the driver's driving, however unsafe. Four were embarrassed to say something. Three felt that it was not their place to comment. Other reasons included fatigue and apathy.

Of the provisional driver group, 11 out of 12 participants reported reasons for remaining silent in unsafe situations. In contrast with the pre-learner/learner drivers, the most common reason for staying silent (given by five of 12 provisional drivers) was because they trusted their driver. Other reasons involved fear of negative consequences for speaking out. As with the pre-learner/learner

group, some provisional drivers cited social concerns: that it was not their place to criticise an older/more experienced driver; that the driver would not listen; or that the driver or their friends and fellow passengers would react negatively. Two provisional drivers were more concerned about safety, pointing out that saying something might have distracted the driver, whereas none of the pre-learner/learner drivers gave this as a reason. Other reasons included feeling it would be hypocritical to comment on a driver's alcohol intake when one was also intoxicated, apathy, and the fact that it was a short trip and the passenger was wearing a seatbelt.

Summary

In summary, both pre-learner/learner drivers and provisional drivers in the current sample reported experiences of feeling unsafe in the three situations examined. However, they responded differently in these situations – pre-learner/learner drivers were more likely than provisional drivers to take no action, and if they said something, it was more likely to be a comment than an explicit request. A potential reason for this discrepancy is the relationship between driver and passenger: provisional drivers mostly reported on experiences in which a peer was the driver, whereas for pre-learner/learners, the driver was more likely to be an older family member. This is reflected in the reasons for staying silent reported by the pre-learner/learner participants, most of which acknowledged the participant's perceived lower social standing relative to the driver.

Experiences as a driver carrying passengers

This part of the questionnaire was given only to the provisional drivers. This section was similar to the section about experiences as a passenger, except that it asked participants about their experiences as a driver. Specifically, participants were asked to recount whether a passenger they were carrying had ever asked them to slow down, drive further from the car in front, or not drive because they had been drinking or taking drugs. In each case, participants who responded 'yes' were asked to specify the gender and relationship to them of the passenger who had spoken up, and of any other passengers present. Participants were subsequently asked to indicate how they felt about the passenger's request; how they had responded; and if they had not reacted in accordance with the passenger's request, whether the passenger said or did anything else.

Driving at excessive speeds

Participants were given six options to answer the question 'How did you feel when the passenger asked you to slow down?' These were: a) didn't care; b) angry – no one should tell me how to drive; c) happy – I wasn't aware that I was driving too fast; d) embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules; e) irritated – I wasn't driving too fast; or f) something else, please describe. In parallel with the section on experiences as a passenger, the options given to describe the driver's reaction to the passenger's request were: a) nothing – did not change speed (undesired response); b) slowed down (desired response); c) increased speed (undesired response); d) stopped the car so the passenger could get out (desired response); or e) something else, please describe (could be categorised as either desired or undesired depending on details of the response given). Table 8.4 summarises the reports of the provisional drivers, grouped by feeling and type of response.

Table 6.4. Number of participants in the provisional driver group (n=5) as a function of their initial feelings and responses when asked by their passenger to slow down.

	Driver's initial reaction	
Driver's feelings	Desired response	Undesired response
Didn't care	0	0
Angry	0	0
Happy	1	0
Embarrassed	1	0
Irritated	2	0
Other	1	0

As shown in Table 6.4, approximately half (five of 12) drivers stated that they had been asked to slow down by a passenger. Four of these five drivers were male. In every case, the passenger was the only other person in the vehicle, and a female friend, sibling, or parent. Two drivers said they felt irritated, one was embarrassed, one was happy, and the fifth was afraid his passenger (sister) would tell his mother. Each of these drivers reported that they slowed down after the passenger's request.

Driving too close to the car in front

As with the previous section, participants were given six options to answer the question 'How did you feel when the passenger asked you to 'back off' from the car in front?' These were: a) didn't care; b) angry – no one should tell me how to drive; c) happy – I wasn't aware that I was driving too close to the car in front; d) embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules; e) irritated – I wasn't driving too close to the car in front; or f) something else, please describe. The options given to describe participants' reaction to the passenger's request were: a) nothing – stayed at the same distance to the car in front (undesired response); b) backed off (desired response); c) got even closer to the car in front (undesired response); d) stopped the car so the passenger could get out (desired response); or e) something else, please describe (could be categorised as either desired or undesired depending on the details of the participant's response).

A summary of the provisional drivers' initial feelings and responses when asked to 'back off' from the car in front by a passenger can be found in Table 6.5. Again, almost half (five of 12) of the provisional drivers reported that a passenger had asked them to back off from the car in front. Interestingly, these were different drivers from those who reported being asked to slow down by a passenger. Only one of these drivers was female. The passengers ranged from girlfriend, boyfriend, male friend, friend of unspecified gender, to mother. In only one case were there any other passengers in the vehicle (friends, of unspecified gender). As shown in the Table, three of the drivers said they felt embarrassed at the passenger's request, while two felt happy. All five

participants responded desirably, specifying that they subsequently drove further away from the lead vehicle.

Table 6.5. Number of participants in the provisional driver group (n=5) as a function of their initial feelings and responses when asked by their passenger to 'back off' from the car in front.

	Driver's initial reaction	
Driver's feelings	Desired response	Undesired response
Didn't care	0	0
Angry	0	0
Happy	2	0
Embarrassed	3	0
Irritated	0	0
Other	0	0

Driving under the influence of alcohol and drugs

The six options given to participants to answer the question 'How did you feel when the passenger asked you not to drive because you had been drinking or taking drugs?' were: a) didn't care; b) angry – no one should tell me how to drive of what to do; c) happy – I wasn't aware that I was unfit to drive; d) embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules; e) irritated – I wasn't too drunk to drive; or f) something else, please describe. The options given to describe their reaction to the passenger's request were: a) decided to drive anyway (undesired response); b) let someone else drive instead (desired response); or c) something else, please describe (could be categorised as either desired or undesired depending on the details of the participant's response).

Only two participants (both male) in the provisional driver group reported that they had been asked not to drive because they had been drinking or taking drugs. In one case, the sole passenger was a friend. The driver said he felt irritated, but responded desirably by deciding to wait and drive a few hours later instead. In the second case, the passengers were female and male friends. The driver reported that he was happy with their comments and let somebody else who was not intoxicated drive instead.

Summary

Although the small number of participants limits the conclusions that can be drawn, it appears that when a passenger asked for the driver to alter his/her driving behaviour, the result was more positive than negative. No provisional drivers reported getting angry with a passenger who made a request, and all complied with those requests. This indicates a discrepancy between passenger's expectations of consequences and the likely actual consequences. However, given the overly positive outcomes, a social desirability bias in participants' pattern of responding cannot be discounted.

6.3.2 Focus Group Discussions

The aim of the focus group discussions was to further investigate the need for team training, and to assess reactions to the proposed content and methods. The discussion is organised so that the responses of each group to a particular theme are compared and contrasted. The first section is on the need for team training. This includes opinions on how teamwork in the car could be valuable for young drivers and passengers, and where participants could anticipate barriers to the training's effectiveness. The second section focuses on training techniques, both those that are used in the current Road Ready classroom and Road Ready plus programs and those that were identified during earlier phases of the project.

Establishing a need for team training

Examples of teamwork

Each discussion began with the facilitator asking the group whether they could think of any examples of how young drivers and passengers working as a team could prevent crashes. Both pre-learner/learner groups identified pointing out hazards and maintaining a safe speed. Provisional drivers also thought of hazard perception, and it was suggested that passengers could reduce driver workload by assisting drivers with tasks that are not essential to driving. Hazard perception was also suggested by teachers of the year 10 program. They noted that the existing program already encourages pre-learners to practice 'commentary driving' with their parents, which includes pointing out hazards. Facilitators of the Road Ready Plus course thought that an important potential use for teamwork could be passengers knowing when to keep quiet so as not to distract the driver during particularly complicated manoeuvres. They also observed that groups of friends who use a 'designated driver' are already using teamwork, in that the passengers do not encourage the driver to drink (as they presumably would if he/she were not driving).

Potential usefulness and effectiveness of team training

In turn, participants were introduced to the concept of CRM training, and asked whether they thought this would be useful (in general, and in specific situations) for young drivers and their passengers, and what barriers to effectiveness might arise.

Both pre-learner/learner groups initially answered that training could be useful, in some situations. However, they could see problems with passengers attempting to implement the teamwork concept improperly. Both groups pointed out that a passenger continually indicating hazards could distract the driver. One group thought that it would be more annoying than useful and the driver would just tune out. The other group was somewhat split on the usefulness of passengers pointing out hazards at all. Some participants felt that by the time the passenger had warned the driver, drivers would not have enough time to take evasive action. The others could see how it would be useful when a dangerous hazard came up. All agreed that constant 'nagging' would be useless. With regards to unsafe driving, it was noted that some drivers do not like being told what to do, so when asked to (e.g.) slow down, they might speed up just to annoy the passenger. One of the pre-learner/learner groups seemed to think that communication skills training would not make much of a difference in the situations given as examples in the focus group (pointing out hazards, and speeding). They agreed that maturity was more important than age, and that some people's personalities led to them being unsafe drivers. They maintained that

only experience would improve these drivers' skills and attitudes. However, the second group thought that communication skills training was a good idea, particularly the idea of training drivers to accept constructive criticism.

Provisional drivers were more positive about the possibilities of team training. The male and female group of provisional drivers thought it would be a good idea to give passengers the confidence and strategies to say something when they feel unsafe, and drivers the knowledge of how to deal with constructive criticism. The male-only group thought that training had the potential to be useful, but might just be ignored (especially by young males). They also felt that the training would have to include how a passenger can comment on someone's driving without appearing nagging or patronising. This group also suggested training for drivers in how, for example, to ask noisy passengers to be quiet at high workload times. Both groups also mentioned the possibility of driver distraction caused by passengers pointing out hazards.

Participants in the teacher group were also concerned about the possibility of passengers pointing out hazards as a source of distraction for the driver. For example, they noted that if passengers are checking for cars on one side while the driver looks on the other, it is actually not helpful to have passengers saying 'go, go' if the driver is not ready to move out. Some young passengers might even think it is funny to tell the driver it is safe to go when it is actually unsafe. If passengers are encouraged to judge the sobriety of a driver while under the effects of alcohol themselves, they might tell someone who has been drinking that they are fine to drive when actually they are not. For these reasons, the teachers agreed that team training had more potential to be useful in situations of unsafe driving than for hazard detection or preventing drink driving. They also noted that the suggested strategies had to be realistic – a young passenger might actually be safer staying in a speeding car than demanding to get out, as many roads in the ACT are quite isolated as they run through long stretches of bushland. In short, the teachers felt that training passengers to participate more in the driving task could lead to confusion; messages would have to be crafted and conveyed carefully. They also noted that males especially might not take in the training, as they believe they are invincible. To counter this factor, teachers suggested using materials with which young males identify (e.g. male drivers/passengers in video sequences). In addition, they thought that year 10 students might pay more attention to CRM ideas if they watched pilots demonstrating use of CRM techniques in the cockpit. Similarly, sports captains could come in and talk to the class about the importance of teamwork in their particular sport.

Facilitators thought that training would be useful both to teach young drivers to listen to their young passengers, and to teach young passengers how to communicate in ways that increase the chance that the driver will co-operate. They could also see a role for confidence building, both for passengers who are hesitant to speak up when they feel unsafe, and for drivers who have difficulty ignoring distracting passengers. A particular focus might be back seat passengers. Passengers in the back seat feel more disconnected from driving; they are not as aware of hazards, so they do not feel that they need to take responsibility for safety. This can lead to behaviour that can distract the driver. The facilitators thought that focussing on the risks associated with carrying passengers might discourage designated driving. This would be especially difficult when combined with bad judgement caused by alcohol. Different scenarios will need different tactics: a young driver taking his friends home from footy training is different from the same driver and passengers driving home from a party.

Most groups brought up the relationship between the driver and passenger as an important factor moderating communication. Facilitators thought a seventeen-year-old might be happy to tell his

father 'you're going too fast, slow down', but uncomfortable telling his friend the same thing for fear of negative social consequences. On the other hand, both pre-learner/learner driver groups felt that they were less likely to comment on their parents' (and other more experienced drivers') driving, as they felt that they did not have enough experience to know when to speak up, and feared that they would not be listened to even if they did comment. However, pre-learner/learner drivers also felt that young drivers were unlikely to take comments from passengers seriously, especially if they knew that the passengers had less driving experience than themselves, or if the passenger were seen as the 'worrying' type. The provisional drivers also thought that older drivers were less likely to take advice from young passengers, and all drivers were unlikely to take advice from passengers who do not have a driver's licence.

Most groups realised that different communications strategies would work for different people. Participants in both the teachers' group and one of the provisional driver groups proposed using young peoples' knowledge of their friends' communication styles to advantage. Teachers suggested that the Year 10 program could concentrate on 'how to talk to your best mate', which could then flow on to other areas such as mental health; at the end of the program participants could make a pact with their best friend (or someone else in the class) to take joint responsibility for safety when they are in the car together. It was suggested that groups of friends could agree to go to the Road Ready Plus course together, learn to work as a team through the program, and remind each other about it afterwards. Both of these ideas make use of the natural 'teams' that exist as groups of friends, and bring them into the driving setting.

From these comments, it appears that there is a need for training on how young passengers and drivers can work as a team. As passengers, young people should be taught when it is appropriate or inappropriate to bring to the driver's attention a potential hazard, as well as what is the best way to point out a potential hazard. They also need to learn strategies to speak up about driving that makes them feel unsafe, without fearing a negative reaction on behalf of the driver. Young people who drive need to learn how to appreciate constructive criticism, and how to encourage their passengers to behave responsibly. An important part of the training should be about different communication strategies, and how different people respond to them.

Perceptions of current techniques in the Road Ready classroom and Road Ready Plus programs

Teachers and facilitators were asked what activities seemed to work the most and the least with the age group they taught, in terms of how much participants enjoy the activity and how much they learn from it. Pre-learner/learner drivers and provisional drivers were asked about which activities they had enjoyed, disliked, and which ones they learned the most and the least from, in the course which they attended (the year 10 pre-learner Road Ready classroom course or the Road Ready Plus course, respectively). The purpose of this section was to gain an idea of the types of activities currently used in the Road Ready programs that are most effective and enjoyable for students, so that similar techniques can be considered during the design and development of methods and materials for imparting team training.

Road Ready classroom course

Teachers described a range of strategies that they used to teach the Road Ready classroom course. Incorporating small challenges and exercises into the program wherever possible was described as

an effective way to ensure students took in the messages. Two teachers who had low-ability streams said that getting the students to copy notes from the board was actually one of the most effective methods to keep them focussed on the lesson, as 'it's what they expect'. These teachers also thought their students enjoyed owning the workbook. Videos could be helpful, although students often became distracted by irrelevant items, especially if the videos were too long. One group of pre-learner/learner drivers said that the videos of potentially hazardous scenarios went on for too long and were unrealistic.

Teachers agreed that the road safety advertisements included in the Road Ready program are well received by students. Teachers thought that students also enjoyed activities such as walking two seconds behind someone, and looking through the 'beer goggles' – 'they love doing things that make them look stupid!' Other popular activities included putting together a box of what they would drink at a party and measuring a standard drink. Also popular was calculating the cost of driving (picking a car from the newspaper/online, deriving costs for insurance, petrol, maintenance, and so on). All of the teachers agreed that the students most enjoyed practical activities.

The pre-learner/learner drivers reported liking practical activities that grabbed attention and had an obvious link to driving. Both groups mentioned the beer goggles, card sorting, computer test of road rules, and videos as enjoyable and worthwhile. One group noted that a variety of different strategies would be necessary to accommodate different students' learning styles. The statistics were not popular, described by one female participant as 'a bit of an overload'. Another female said that some of them were interesting, but some of them seemed useless. One female commented that the males in her class had refused to believe the statistic about stopping distance at various speeds. The video on 'the physics of crashing' was also seen as too mathematical. Teachers similarly felt it was difficult to deliver the messages involved in some of the more mathematical parts of the program like calculating blood alcohol content and stopping distance. Teachers felt that some modules went on for too long; a sentiment echoed by their students, the pre-learner/learner drivers. Students felt that the workbook was too repetitive, particularly the focus on alcohol/drugs and speeding. Pre-learner and learner drivers preferred information about how to drive, not about how not to drive.

Road Ready Plus course

Facilitators thought that the techniques which worked best for Road Ready Plus participants were a combination of statistics (to emphasise the factual basis of road safety messages), videos to get the participants interested, and role plays to give participants some experience of what a particular situation is like. They agreed that lecturing was an unpopular and ineffective method of teaching – group discussion works much better, as messages that come from peers are regarded as more valid. Confirming the facilitators' views, provisional drivers liked the group discussion, although those who had been more experienced drivers than the other participants at their course felt that they did not get as much out of it as the less experienced drivers. Another comment from the provisional driver group was that group discussion increased confidence, because 'you feel like you're not alone in having done some dumb things!' Both provisional driver groups agreed that the videos (of road safety advertisements) were high impact. Similarly, both groups liked the maze activity; they enjoyed it and could see its relevance to driving. One group mentioned receiving facts like 'if the person in front of you is tailgating, double your distance' as useful. The other group mentioned an activity involving a set of answer cards, from which you had to pick the

correct answer to a question. Although they could see that this activity was intended to increase awareness of how and when crashes are likely to happen, they felt that the questions were badly worded and that these points could have been made in a more effective way. The beer goggles were not nearly as popular with the provisional drivers as they were with the pre-learner/learner group, as they felt that the beer goggles did not demonstrate anything new. The preparatory activities received mixed comments; the easier ones (such as posters) were felt to be a waste of time, while those that required effort (e.g. talking to more experienced drivers) were useful. Provisional drivers thought that it would make more sense to make the useful, effortful activities compulsory and scrap the rest, or perhaps have a prize for the best so that Road Ready Plus participants were encouraged to put more effort into these activities. Finally, the male and female group liked the messages that they wrote during the course and that were sent to them later (for example, a reminder to oneself to count two seconds' distance when driving behind another car).

Perceptions of potential team training techniques

Finally, each group was asked for their opinions on four suggested training techniques. These included a lecture-style presentation on communication strategies, a role-play followed by comments from observers, a video followed by group discussion, and a video game that could only be won if everyone worked as a team.

Lectures

Teachers agreed that students were unlikely to get much out of a lecture about ways to communicate, although it would be easy to teach. Less formal lectures (i.e. group discussions) work better, so that teachers can incorporate students' questions and comments and go in different directions, rather than sticking to a set formula. It was noted that telling a story is one way to gain students' interest. Another idea was that year 11 and 12 students who already have their licences could come in and talk to the year 10 students about their own experiences with communication in the car.

Facilitators believed that participants in the Road Ready Plus course did not enjoy lectures, and that they were not an effective way to get the message across. They thought that a more effective strategy involves participants sharing their own experiences of what communication strategies they have used (or seen used) and what worked; brainstorming alternatives and thinking about consequences.

The pre-learner/learner groups agreed that lectures were boring, and that they did not learn anything from them. Provisional drivers also felt that they would 'tune out' or fall asleep in a lecture. Both of the provisional driver groups suggested a more interactive approach – the lecturer could ask questions of participants, or the workshop leader could demonstrate a communication strategy, then participants could try it in small groups, then come back to the large group and have a discussion about how it worked. These modifications would be valuable, but a lecture by itself was felt not to cater well to different learning styles.

Role-plays

Although role-plays can be quite effective, teachers noted that some students do not take this activity seriously. A remedy for this would be to get students used to doing role-plays from earlier

in their schooling. Like the teachers, some participants in the pre-learner/learner group thought a role-play would work well, but others (males in particular) suggested that it would not be taken seriously. It was felt that this problem would be worse in small groups than with the whole class where the teacher was watching. Facilitators thought the role-play would work well, although they too noted that it could potentially be turned into a 'joke' if participants were not prepared to take it seriously. The male group of provisional drivers also thought that a role-play was unlikely to be taken seriously, especially by young males.

The focus group facilitator asked whether a script would help counteract the tendency of some participants to make up incongruous 'lines'. Teachers felt that scripts could be useful and that the students would enjoy making their own scripts. The male and female group of provisional drivers thought that multiple choice scripts would be good, however the male group felt that a script would not help. They thought that the problem was more that a classroom setting was not sufficiently realistic. Some participants in the pre-learner/learner group also felt this way, and suggested using some prop that reacts to what the driver and passengers are saying. The male group of provisional drivers was more specific, suggesting that the role-players could view a video, perhaps with the passenger's screen being wider, so that passengers could actually try their hand at pointing things out to the driver that the driver had not seen. Another suggestion from the male and female group of provisional drivers was that participants could watch a video of people acting out a certain situation first, to 'get the hang of it'. They felt that feedback from observers would also be helpful.

Opinions were mixed on the effectiveness of role-plays involving small groups where all group members play a role versus a small number of people performing the role play while being observed by the rest of the class/group. The pre-learner/learner and provisional drivers noted that people were more likely to 'mess around' in small groups than in large groups. On the other hand, some participants in the pre-learner/learner groups felt that small groups would force everyone to take part, rather than 'tuning out' as they might do while watching others role-play. Facilitators thought that small groups might be easier to facilitate than having the entire class watching one role-play. The pre-learner/learner and provisional drivers raised shyness as a potential barrier to some participants effectively taking part in a role-play. Both groups suggested that those who are shy might find it easier to participate in a small group, as long as they were not required to form a group with particularly extraverted people.

Video followed by group discussion

The teachers thought that a video could work well, provided the students could identify with the characters. Videos have to be up-to-date; otherwise students may be distracted by irrelevant topics such as hairstyles. For this reason, it was suggested that students could perhaps make their own videos, which would involve more active participation and perhaps increase learning. Group discussion can be effective if everyone in the class is sufficiently knowledgeable about and interested in the topic to be in a position to contribute. Otherwise, group discussions tend to become dominated by a small number of participants.

The pre-learner/learner groups also felt that most people 'tuned out' during group discussions. It was suggested that having to write notes on the video might help students remember what it was about better than a group discussion. Videos were popular with the pre-learner/learner drivers, as long as they were realistic and not too long. One group was asked about the teacher's suggestion

of students making their own video. These students felt that this activity would be both enjoyable and an effective way to learn.

The facilitators felt that videos were a useful tool. It was noted that having a visual stimulus aids learning, especially for those with visual (rather than auditory or tactile) learning styles. Confronting videos can also be quite effective at 'shocking' people into re-examining their behaviour.

Provisional drivers generally thought that watching a video of a driver and passenger interacting would be better than a role-play, as it would be more realistic. However, they noted that the acting would have to be good and the script would have to take into account factors that affect communication, like the relationship between the driver and the passenger. Both groups of provisional drivers thought that it would be an improvement to film a variety of communication strategies, (and possibly a variety of people using them, to maintain realism) because different people will respond better to different communication strategies.

Video games that can only be won if all players work as a team

The teachers observed that anything competitive works well, and so having teams of drivers and passengers racing against each other in a videogame would be popular. However, teachers noted that most teenage girls do not play videogames, nor do students who cannot afford to have them at home. Accordingly, these students might feel left out.

In the pre-learner/learner groups, males regarded video games positively, although they understood that not everyone enjoyed them. The female participants in one group said that a video game would be good if it were realistic enough to involve pedals and gears, more like a driving simulator. The other group thought that a videogame would not be helpful as there are plenty of driving video games on the market already and they are not realistic – 'everybody knows that driving a car is not like driving in a game'.

The video game idea was well received by facilitators, although they noted the logistic difficulties involved in both developing such a tool and finding adequate resources to use it. If it were developed and resourced adequately, however, they noted that, like the role-play, a video game could work effectively to train communication skills either in small groups or with the rest of the group looking on and later commenting.

The male and female group of provisional drivers thought that a video game would be enjoyable because everyone would get to do something, although it would need to be obviously relevant to what they would actually be doing in a car. The male-only group had concerns that it would be difficult to set up, and suggested playing some alternative team game such as 'team twister', or 'passengers' guiding a blindfolded 'driver' through a room full of obstacles. Again, these activities would require an explanation as to why they are relevant to roles in the car.

Summary

In general, focus group participants were positive towards the concept of team training. Several of the teachers and facilitators commented that there are sections in the current Road Ready classroom and Road Ready Plus programs that could be extended to focus more on the theme of communication between drivers and passengers. With regards to the type of activities that work best, practical interactive activities seem to be most enjoyable for both target age groups. It is also

important for participants to be able to easily connect the activity to their behaviour in the car. However, since participants in the pre-learner Year 10 program have not yet acquired any practical experience driving a car, they require activities which demonstrate what it is like in a vehicle rather than activities which rely on their imagination. The Road Ready Plus course however can take advantage of the fact that participants already have some experience in driving with passengers, and thus could involve activities such as group discussion about previous experiences with communication difficulties and successes while driving.

Chapter 7 Recommendations for Incorporating CRM Training into Current Young Driver Training in the ACT

The research conducted in the study up to this point served to highlight the potential for incorporating CRM training into current young driver training in the ACT. The next phase of the research involved the development of a set of recommendations for achieving this goal. To assist in this process, a workshop was held on December 15th, 2004 at MUARC. Present were three members of the MUARC project team (Jessica Edquist, Eve Mitsopoulos and Michael Regan) and several SMEs: Andrew Lowe (Dédale Asia-Pacific), who brought to the group expertise in CRM training, and Simon Abbott (Freebott), Gayle Di Pietro (GDP consulting), and Kerrie Hawke (ACT Department of Education and Training), who together brought to the group expertise in road safety education and young driver training and, in particular, a thorough knowledge of the content and delivery of current young driver training in the ACT. An additional staff member from MUARC (Nicola Fotheringham) was also present to assist with documenting the key outcomes of the workshop. The specific aims of the workshop were to gain input from the SMEs on two issues:

- the research conducted as part of the study to date and the associated findings; and
- recommendations for the implementation of a young driver CRM training program within the ACT.

As a result of the workshop and the research conducted as part of earlier phases of the study, the following recommendations were made regarding the development and implementation of a driving CRM training program within current young driver training in the ACT:

1. CRM in young driver training is an appropriate concept to pursue. The application of CRM within young driver training has potential to significantly enhance the positive and reduce the negative effects of passengers on young driver behaviour and, therefore, young driver and passenger safety.
2. CRM should be offered as part of young driver training in the ACT, with an emphasis at first on the skills that are most likely to have a big impact on safety.
3. The key features of CRM training, which ensure its effectiveness, are practice and feedback. It is vital that these aspects of the program are incorporated into any young driver CRM training program because a theoretical understanding of the skills alone is not sufficient to ensure behaviour change.
4. The driver CRM training program should have a clear focus on road safety, with an emphasis on modifying behavior for a safer outcome.
5. The driver CRM training program should cater for the differences between the driving and aviation domains. In particular, the driver CRM training program should emphasise the potential differences between drivers, the benefits arising from passenger monitoring of driver performance, the importance of teamwork, the benefits arising from passengers and drivers

working effectively as a team, and the potential road safety improvements resulting from effective teamwork in driving.

6. Emphasis should be placed on clearly explaining passenger influences on the driver, how the team concept applies to driving, when the team concept should be applied and the skills necessary for drivers and passengers to act as an effective team.
7. The component of CRM that would appear initially to be most useful for young drivers and passengers is effective communication, and this is covered only tangentially in current young driver training in the ACT. The young driver CRM training program should therefore focus on the training and development of effective communication skills.
8. The scenarios for training communication skills should be derived from three key team-based activities:
    - ensuring the driver is fit to drive;
    - ensuring the driver is driving safely; and
    - ensuring hazards are perceived and corrective action is taken.
9. The "support process" is an example of a communication strategy that could be included within young driver CRM training. This technique is used in the aviation domain and is designed to address problems before safety becomes compromised. The authors recommend that investigations are made into the adaptation of the "support process" technique and other appropriate communication strategies for use in the driving domain.
10. Consideration should be given to integrating appropriate CRM training into current Road Ready modules. In particular, it was recommended that formal CRM training be integrated into the Road Ready classroom and Road Ready Plus courses and that, as part of a later iteration of the training development, consideration be given to use of the Learner module as a further avenue for CRM training. It is recognised, however, that there is limited space within the existing Road Ready classroom and Road Ready Plus courses and that, on a practical level, the inclusion of CRM training may be difficult to achieve. While not usual practice in some domains in which CRM training is given, the potential for a stand-alone young driver CRM training course should not be prematurely discounted. As such, it is recommended that further investigation be conducted regarding the benefits and disbenefits of integrating CRM training within current young driver training in the ACT as opposed to the potential development of a stand alone CRM course. A combined approach offers a further option. This process may include the conduct of a needs analysis involving driver training and CRM training SMEs.
11. From a developmental viewpoint, the timing of young driver CRM training is crucial. Young driver CRM training interventions may be more likely to have a greater impact when delivered to trainees at a later stage of development. However, it is recommended that aspects of CRM should be implemented at the earliest stage possible. The following offers a potential timeline for CRM training implementation:
    - Junior and middle High School levels (years 7, 8 and 9. Raise awareness of the general importance of effective communication in certain situations and not necessarily in situations restricted to driving.

- Senior High School and College levels (years 10, 11 and 12) . Commence formal exposure to CRM principles in driving as part of the Road Ready classroom course, and through peer facilitation as part of the ACT "Mentoring Road Safety Kit". This involves Year 11 and 12 College students (who have received their Provisional Licence) preparing and delivering lessons on road safety to Year 10 students (who have not yet started to drive) that draw on their own experiences as novice drivers.
- Road Ready Plus course. Provide formal CRM training as a pre-workshop activity with follow-up discussion at the workshop.

12. The delivery of young driver CRM training should make use of the following methods as appropriate:
    - lectures, incorporating group discussion;
    - role-plays;
    - video demonstrations followed by group discussion; and
    - video games which can only be won if everyone works as a team.
13. There should be a meaningful incentive for young drivers to complete CRM training. One possible incentive would be the award of one credit point towards students' Year 12 College certificate upon completion of the CRM training.
14. The amount of CRM training provided is also crucial. It is recommended that further investigation into the minimum level of CRM training required be conducted. As in recommendation 10, this might be achieved through the conduct of a needs analysis involving young driver training and CRM training SMEs.

Further, the authors recommend that a pilot young driver CRM training program be developed, implemented and tested based upon the recommendations described above.

Chapter 8 Conclusions

8.1 Summary of Findings

The main aim of this research was to examine the potential application of CRM training within young driver training in the ACT. Initially, a literature review of young driver crash risk and behaviour in the presence of passengers, young driver training programs and CRM training was conducted. According to the literature, young drivers are more likely to be involved in road crashes than other age groups. It is suggested that their increased risk of road crash involvement is attributable to a number of factors, including lack of experience, poorly developed driving skills, impulsiveness, deliberate risk taking and sensation seeking, unsafe driver behaviour (e.g. drinking, drug taking and close following) and also an over estimation of driving ability and under estimation of the risks involved (McDonald 1994). Additional research into driver behaviour has identified both the possible positive and negative influences that the presence of passengers can have on driver behaviour. In a study of how passengers influence young drivers, Regan and Mitsopoulos (2001) found that passengers could play a number of roles as co-pilots of the vehicle, including navigation, operation of in-vehicle devices, interacting with the driver to relieve boredom and maintain alertness, and speed monitoring and warning of hazards. As a result of these findings, Regan and Mitsopoulos (2001) recommended, among other things, that the principles of CRM training might be beneficial in addressing some of the problems associated with young drivers in the presence of passengers. The rationale for this suggestion is that passengers already influence young drivers, sometimes in negative ways, and that training might increase the passenger's ability to *positively* influence drivers and drivers' ability to accept constructive feedback. CRM training involves the development of the higher order cognitive skills that are used in teamwork. CRM comprises a suite of techniques that train team skills and, as such, has been adapted for use in a number of different domains. The literature review highlighted the potential of CRM training as a team training intervention for the driving domain.

The next phase of the research involved analysing current young driver training in the ACT in order to identify potential areas into which CRM training could be incorporated and also to determine whether CRM principles are already covered within the training. A review of the literature associated with the four-phase Road Ready program, including teaching resources, course notes and documentation and information leaflets, was conducted. The analysis revealed some significant underlying similarities between CRM training and current young driver training in the ACT, and also highlighted a number of CRM principles that are not currently covered. Additionally, it was concluded that the Road Ready classroom and Solo Driver Road Ready Plus programs provide a suitable framework within which to deliver formal CRM training to young drivers and that consideration should be given to including additional specific CRM training principles within these modules.

To investigate the potential content and delivery of a driver CRM training program, three tasks were undertaken. Firstly, the key differences between driving and aviation were distinguished. As a result of this a number of recommendations regarding the driving CRM training program were made. Secondly, in order to determine the team-based activities exhibited during the driving task and also the KSAs required to carry out those tasks, an analysis of the driving task based upon the procedure recommended by Salas and Canon-Bowers (1997) was conducted. The results of the

analysis provided examples of how CRM training might be applied in driver training programs and, in particular, which team-based activities would require training. Thirdly, CRM experts from the aviation and medicine domains were consulted in order to determine what the content of a driving CRM program should be, and also to identify suitable CRM training techniques for use in the driving domain. As a result of this, it was recommended that the emphasis of young driver CRM training should be placed on the concept of teamwork and communication skills, and that initial CRM interventions would focus upon the communication skills required to conduct three key driving team-based activities: *ensuring the driver is fit to drive, ensuring the driver drives safely, and ensuring hazards are detected and appropriate action is taken*. Possible training methods for the CRM training program were also identified, including lectures, role-plays, video demonstrations, and video games which can only be won if players work as a team.

In order to assess young driver and trainer perceptions of, and reactions towards, team training in the driving domain and the proposed CRM training delivery methods outlined above, a series of focus groups was conducted. While the small numbers of participants taking part in the focus groups limits the extent to which definitive conclusions can be drawn, the results of the focus groups, nevertheless, indicated that participants were positive towards the concept of team training within the driving domain. Further, possible sections of the current Road Ready classroom and Road Ready Plus programs where driver and passenger communication could be focussed upon were also identified. Focus group participants also felt that practical or interactive activities would be the most suitable format for CRM training.

As a result of the findings described in this report, it is concluded that the integration of CRM training principles into current young driver training in the ACT is a worthy concept to pursue. It is the opinion of the authors that the provision of CRM training has potential to significantly enhance the positive effects of passengers on young driver behaviour and thus the safety of young drivers and passengers alike. The final stage of this research involved the development of a set of recommendations for developing and evaluating a driver CRM training program in the ACT. In conclusion, it was recommended that a pilot young driver CRM training program be developed as the first step in the process.

8.2 Recommendations for Further Research

In the course of conducting the research reported here, it became apparent to the authors that there is great scope for further research into driver CRM training programs. To the authors' knowledge, there has been no research into CRM training in the driving domain reported in the open literature. In general, the concept of team training within the driving domain has been neglected by research communities. Consequently, the concept of driver CRM training is still in its infancy and further research is required. Additionally, the work conducted by the authors in this research has highlighted the need for specific areas of further research. These areas are summarised below:

- Before a trial CRM driver training program is developed, further investigation into the potential integration of a CRM driver training program into current young driver training in the ACT is required. In particular, the issue of whether CRM training is delivered as a stand-alone program or integrated into existing Road Ready modules needs to be resolved.

- Issues regarding the timing of delivery, the level or amount of training provided and also the training content should be investigated thoroughly. The authors recommend that a needs analysis be conducted in order to resolve some of these issues. The effect of CRM training on current young driver training programs should also be investigated in order to ensure that existing learning outcomes are not compromised.
- An exhaustive analysis of the team-based activities and the KSAs required during driving is required. An initial analysis of the team-based activities and the KSAs required during driving was conducted as part of the research described in this report. The authors acknowledge that that a more comprehensive analysis is required in order to derive the complete set of driving team-based activities and associated KSAs.
- Development of a pilot young driver CRM training program. The potential implementation and benefits of CRM training in young driver training in the ACT is highlighted in this report. Once the issues described above have been resolved, the next logical phase of this research would be the development of a pilot young driver CRM training program based upon the recommendations presented in this report.
- Development of CRM skills assessment methodology. In order to test that the pilot CRM driver training interventions are successful, a methodology for assessing CRM behaviour in the driving domain is required. Although such methodologies exist within the aviation domain (see section 3.8 of this report), it is the opinion of the authors that a driving-specific methodology based upon the pilot driver CRM training program is required. In order to develop such a methodology, a study investigating the application of existing (aviation based) CRM skills assessment methodologies in the driving domain is required. The findings of such a study would then be used to inform the development of a driving specific CRM skills assessment methodology.
- Pilot young driver CRM training program evaluation study. Once the pilot CRM training program has been implemented, an evaluation study (or studies) would be required in order to ensure that the program works. This would involve testing participants subjected to the pilot CRM training program using the driving CRM skills assessment methodology described above.
- CRM skills assessment method validation study. In order to ensure that the driving CRM skills assessment methodology offers a valid and reliable assessment of the CRM skills exhibited by drivers, a validation study is required. According to Flin and Martin (2001) despite the extensive literature on the measurement of individual and team performance there have been few studies comparing rating scales for CRM performance. Consequently, it is also recommended that a comparative study of CRM skills assessment methodologies be conducted.
- Development and implementation of an ACT-wide driver CRM training program. If the pilot CRM training program were found to be successful, the next stage would involve the development and implementation of an ACT-wide young driver CRM training program.
- Driver CRM training program evaluation study. Once the final CRM training program is implemented in the ACT, an evaluation study (or studies) would be required in order to ensure that the program works. This would involve testing participants subjected to the CRM training using the driving CRM skills assessment methodology described above.

- In general, there is little research into the concept of team activity in the driving domain. This is in contrast to other domains in which team based activity is a feature. Consequently, it is recommended that further, general, research into the concept of team performance in the driving domain is conducted. There are a number of areas of interest within this area, such as the analysis of team performance, allocation of functions between team members, team errors, team situation awareness, and team building.

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Appendix A Focus Group Questionnaires

QUESTIONNAIRE FOR PRE-LEARNER AND LEARNER DRIVERS

1. What is your age (in years and months)? ☐

2. Are you male or female? ☐ Male ☐ Female

3. Have you completed the Road Ready course?

   ☐ Yes (go to Question 3a) ☐ No (go to Question 3b)

   a. If Yes, when did you finish the course (e.g. March 2004)?

   ☐

   Do you have your Learner Licence?

   ☐ Yes ☐ No (go to Question 3c)

   ↓

   When did you get your Learner Licence (e.g. June 2004)?

   ☐

   (go to Question 3c)

   b. If No, approximately how much of the course have you done (e.g. about half, just started)?

   ☐

   (go to Question 3c)

   c. Did you/ are you doing Road Ready as part of your year 10 studies at High School or at a Road Ready Centre?

   ☐ Year 10 ☐ Road Ready Centre

4. Have you ever felt unsafe when you have been a passenger in a car because the driver was driving too fast?

   ☐ Yes ☐ No (go to Question 9)

5. If you answered Yes, to Question 4, thinking back to one of those situations where you felt unsafe because the driver was driving too fast:

   a. Who was the driver (e.g. brother, mother, father, female friend, male friend)?

   b. Were there any other passengers present? If yes, who were they (e.g. brother, mother, father, female friend, male friend)?

6. What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too fast?

   a. ☐ Nothing

   b. ☐ Asked the driver to slow down

   c. ☐ Asked the driver to stop so I could get out

   d. ☐ Commented on the driver's driving, (e.g. we're going pretty fast) without asking him/her to slow down

   e. ☐ Something else, please describe

7. If you answered b, c, d or e to Question 6, how did your driver respond to what you did or said?

   a. ☐ Continued to drive at the same speed

   b. ☐ Slowed down

   c. ☐ Increased speed

   d. ☐ Stopped the car so I could get out

   e. ☐ Something else, please describe

8. If you responded a, c or e to Question 7, did you say anything else to the driver? If yes, what?

9. Have you ever felt unsafe when you have been a passenger in a car because the driver was driving too close to the car in front?

☐ Yes ☐ No (Go to Question 14)

10. If you answered Yes to Question 9, thinking back to one of those situations where you felt unsafe because the driver was driving too close to the car in front:

    a. Who was driving (e.g. brother, mother, father, male friend, female friend)?

    b. Were there any other passengers present? If yes, who were they? (e.g. brother, mother, father, male friend, female friend)

11. What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too close to the car in front?

    a. ☐ Nothing

    b. ☐ Asked the driver to back off

    c. ☐ Asked the driver to stop so I could get out

    d. ☐ Commented on the driver's driving, (e.g. we're pretty close to that car in front) without asking him/her to back off from the car in front

    e. ☐ Something else, please describe

12. If you answered b, c, d or e to Question 11, how did your driver respond to what you did or said?

    a. ☐ Continued to drive at the same distance from the car in front

    b. ☐ Backed off from the car in front

    c. ☐ Got even closer to the car in front

    d. ☐ Stopped the car so I could get out

    e. ☐ Something else, please describe

    ☐

13. If you answered a, c, or e to Question 12, did you say anything else to the driver? If yes, what?

    ☐

14. Have you ever felt that you didn't want to get into a car with a driver because the driver had been drinking or using drugs?

    ☐ Yes ☐ No (Go to Question 19)

15. If you answered Yes to Question 14, thinking back to one of those situations where you didn't want to get into the car with a driver because the driver had been drinking or taking drugs:

    a. Who was the driver (e.g. brother, mother, father, male friend, female friend)?

    ☐

    b. Were there any other passengers present? If yes, who were they (e.g. brother, mother, father, male friend, female friend)?

    ☐

16. What was the first thing you did or said in that situation where you felt that you didn't want to get into the car because the driver had been drinking or taking drugs?

    a. ☐ Said nothing and got into the car anyway

    b. ☐ Refused to/did not get into the car

    c. ☐ Commented on the fact that the driver had been drinking or using drugs and as such was unfit to drive

    d. ☐ Took measures so that the driver would not drive (e.g. kept the keys away from the driver)

    e. ☐ Something else, please describe

    ☐

17. If you answered b, c, d or e to Question 16, how did your driver respond to what you did or said?

    a. ☐ Decided to drive

    b. ☐ Decided not to drive

    c. ☐ Something else, please describe

    ☐

18. If you answered a or c to Question 17 above, did you say anything else to the driver? If yes, what?

    ☐

19. Thinking about times when you have felt unsafe with a driver but have decided not to say or do anything, what was the most important thing that made you decide not to say anything?

    ☐

20. Thinking about times when you have felt unsafe with a driver but have decided not to say or do anything, what was the next most important thing that made you decide not to say anything?

QUESTIONNAIRE FOR PROVISIONAL DRIVERS

1. What is your age (in years and months)? ☐

2. Are you male or female? ☐ ale ☐ Female

3. How old were you when you obtained your provisional licence (in years and months)?

   ☐

4. How old were you when you did the Road Ready Plus course (in years and months)?

   ☐

5. What made you decide to do the Road Ready Plus course?

   ☐

6. Have you ever felt unsafe when you have been a passenger in a car because the driver was driving too fast?

   ☐ Yes ☐ No (go to Question 11)

7. If you answered Yes, to Question 6 above, thinking back to one of those situations where you felt unsafe because the driver was driving too fast:

   a. Who was the driver (e.g. brother, mother, father, female friend, male friend)?

      ☐

   b. Were there any other passengers present? If yes, who were they (e.g. brother, mother, father, female friend, male friend)?

      ☐

8. What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too fast?

   a. ☐ Nothing

   b. ☐ Asked the driver to slow down

   c. ☐ Asked the driver to stop so I could get out

   d. ☐ Commented on the driver's driving, (e.g. we're going pretty fast) without asking him/her to slow down

   e. ☐ Something else, please describe

   ☐

9. If you answered b, c, d or e to Question 8, how did your driver respond to what you did or said?

   a. ☐ Continued to drive at the same speed

   b. ☐ Slowed down

   c. ☐ Increased speed

   d. ☐ Stopped the car so I could get out

   e. ☐ Something else, please describe

   ☐

10. If you responded a, c or e to Question 9, did you say anything else to the driver? If yes, what?

    ☐

11. Have you ever felt unsafe when you have been a passenger in a car because the driver was driving too close to the car in front?

    ☐ Yes ☐ No (Go to Question 16)

12. If you answered Yes to Question 11, thinking back to one of those situations where you felt unsafe because the driver was driving too close to the car in front:

    a. Who was driving (e.g. brother, mother, father, male friend, female friend)

    b. Were there any other passengers present? If yes, who were they (e.g. brother, mother, father, male friend, female friend)?

13. What was the first thing you did or said in that situation where you felt unsafe because the driver was driving too close to the car in front?

    a. ☐ Nothing

    b. ☐ Asked the driver to back off

    c. ☐ Asked the driver to stop so I could get out

    d. ☐ Commented on the driver's driving, (e.g. we're pretty close to that car in front) without asking him/her to back off from the car in front

    e. ☐ Something else, please describe

14. If you answered b, c, d or e to Question 13, how did your driver respond to what you did or said?

    a. ☐ Continued to drive at the same distance from the car in front

    b. ☐ Backed off from the car in front

    c. ☐ Got even closer to the car in front

    d. ☐ Stopped the car so I could get out

    e. ☐ Something else, please describe

    ☐

15. If you answered a, c or e to Question 14, did you say anything else to the driver? If yes, what?

    ☐

16. Have you ever felt that you didn't want to get into a car with a driver because the driver had been drinking or using drugs?

    ☐ Yes ☐ No (Go to Question 21)

17. If you answered Yes to Question 16, thinking back to one of those situations where you didn't want to get into the car with a driver because the driver had been drinking or taking drugs:

    a. Who was the driver (e.g. brother, mother, father, male friend, female friend)?

    ☐

    b. Were there any other passengers present? If yes, who were they (e.g. brother, mother, father, male friend, female friend)?

    ☐

18. What was the first thing you did or said in that situation where you felt that you didn't want to get into the car because the driver had been drinking or taking drugs?

    a. ☐ Said nothing and got into the car anyway

    b. ☐ Refused to/did not get into the car

    c. ☐ Commented on the fact that the driver had been drinking or using drugs and as such was unfit to drive

    d. ☐ Took measures so that the driver would not drive (e.g. kept the keys away from the driver)

    e. ☐ Something else, please describe

    ☐

19. If you answered b, c, d or e to Question 18, how did your driver respond to what you did or said?

    a. ☐ Decided to drive

    b. ☐ Decided not to drive

    c. ☐ Something else, please describe

    ☐

20. If you answered a or c to Question 19 above, did you say anything else to the driver? If yes, what?

    ☐

21. Thinking about times when you have felt unsafe with a driver but have decided not to say or do anything, what was the most important thing that made you decide not to say anything?

    ☐

22. Thinking about times when you have felt unsafe with a driver but have decided not to say or do anything, what was the next most important thing that made you decide not to say anything?

23. Has a passenger ever asked you to slow down when you've been driving?

☐ Yes ☐ No (Go to Question 28)

24. If you answered Yes to Question 23, thinking back to one of those situations where the passenger asked you to slow down:

a. Who was the passenger (e.g. male friend, female friend, mother, father, sister)?

b. Were there any other passengers present? If yes, who were they (e.g. brother, female friends, male friends)?

25. How did you feel when the passenger asked you to slow down?

a. ☐ Didn't care

b. ☐ Angry – no one should tell me how to drive

c. ☐ Happy – I wasn't aware that I was driving too fast

d. ☐ Embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules

e. ☐ Irritated – I wasn't driving too fast

f. ☐ Something else, please describe

26. What was your first reaction in that situation where your passenger asked you to slow down?

    a. ☐ Nothing – did not change speed

    b. ☐ Slowed down

    c. ☐ Increased speed

    d. ☐ Stopped the car so the passenger could get out

    e. ☐ Something else, please describe

27. If you did not slow down, how did the passenger react to your response (e.g. did your passenger ask you a second time to slow down)? Did your passenger say or do anything? If yes, what?

28. Has a passenger ever asked you to stop from driving too close to the car in front - to back off?

    ☐ Yes ☐ No (Go to Question 33)

29. If you answered Yes to Question 28, thinking back to one of one of those situations where the passenger asked you to back off from the car in front:

    a. Who was the passenger (e.g. male friend, female friend, mother, father, sister)?

    b. Were there any other passengers present? If yes, who were they (e.g. brother, female friends, male friends)?

30. How did you feel when the passenger asked you to back off from the car in front?

    a. ☐ Didn't care

    b. ☐ Angry – no one should tell me how to drive

    c. ☐ Happy – I wasn't aware that I was driving too close to the car in front

    d. ☐ Embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules

    e. ☐ Irritated – I wasn't driving too close to the car in front

    f. ☐ Something else, please describe

    [ ]

31. What was your first reaction in that situation when your passenger asked you to back off?

    a. ☐ Nothing – stayed at same distance to the car in front

    b. ☐ Backed off

    c. ☐ Got even closer to the car in front

    d. ☐ Stopped the car so the passenger could get out

    e. ☐ Something else, please describe

    [ ]

32. If you did not back off from the car in front, how did the passenger react to your response (e.g. did your passenger ask you a second time to back off)? Did your passenger say or do anything? If yes, what?

    [ ]

33. Has a passenger ever asked you not to drive because you had been drinking or taking drugs?

☐ Yes ☐ No (Go to the End of the Questionnaire)

34. If you answered Yes to Question 33, thinking back to one of those situations where you were asked not to drive because you had been drinking or taking drugs:

a. Who was the passenger (e.g. male friend, female friend, mother, father, sister)?

b. Were there any other passengers present? If yes, who were they (e.g. brother, female friends, male friends)?

35. How did you feel when the passenger asked you not to drive because you had been drinking or taking drugs?

a. ☐ Didn't care

b. ☐ Angry – no one should tell me how to drive or what to do

c. ☐ Happy – I wasn't aware that I was unfit to drive

d. ☐ Embarrassed – I don't want people to feel unsafe or to think that I disobey the road rules

e. ☐ Irritated – I wasn't too drunk to drive

f. ☐ Something else, please describe

36. What was your first reaction in that situation where you were asked not to drive?

a. ☐ Decided to drive anyway

b. ☐ Let someone else drive instead

c. ☐ Something else, please describe

37. If you decided to drive, how did the passenger react (e.g. did your passenger stay in the car with you)? Did your passenger say or do anything? If yes, what?

QUESTIONNAIRE FOR ROAD READY CLASSROOM COURSE TEACHERS

1. This question is optional. What is your age (in years and months)?

2. Are you male or female? ☐ Male ☐ Female

3. For how many years have you been teaching?

4. For how many years have you been teaching the Road Ready classroom course?

QUESTIONNAIRE FOR ROAD READY PLUS COURSE FACILITATORS

1. This question is optional. What is your age (in years and months)?

   ☐

2. Are you male or female? ☐ Male ☐ Female

3. For how many years have you been facilitating Road Ready Plus workshops?

   ☐

Appendix B Focus Group Discussion Guides

Focus Group Discussion Guide for Pre-learner and Learner Drivers

1. There have been some suggestions that crashes involving young drivers while carrying passengers could be reduced if young drivers and passengers worked as a team.

    - Can you think of any examples where this might work?

    For example, passengers could be taught how to ensure that a driver who is affected by alcohol or drugs doesn't drive. They could also be taught communication skills to persuade a driver to drive safely, and to help drivers by letting them know of any hazards that they didn't pick up.

    - What are your thoughts on this?
    - How do you feel about drivers and passengers acting as a team in this way?
    - Do you think it would work?
    - Would there be any problems? What sort?

2. Some drivers are reluctant to accept any input from passengers. Team training has been suggested to help drivers understand that passenger feedback can be helpful.

    How useful do you think this would be? Would you put this sort of training to use? Would it work? Will it depend on how the passenger communicates with the driver?

3. Passengers sometimes find it hard to find the right words to use to communicate with drivers. Team training for passengers to help them communicate more effectively with drivers when they feel unsafe has been suggested.

    For example, if the driver was speeding, the passengers could tell the driver in a number of ways how to slow down. The passenger could come right out and say "you are driving way too fast – slow down right now or stop the car so I can get out". Alternatively, the passenger could start off by saying something like "is the speed limit 60 km/h around here?". If that didn't work the passenger could explicitly ask the driver to slow down – "could you slow down a bit please?". If that didn't work, then the passenger could demand the driver slow down or stop the car so that the passenger can get out.

    - What do you think of this sort of approach?
    - Would it work?
    - Would you put this sort of training to use?

- What are some other sorts of communication strategies that young passengers can use to get their young drivers to drive safely?

4. Passengers could also be shown ways to communicate to let drivers know when they have missed something or haven't noticed something vital in the driving scene.

    - Would this work? Would you put this sort of training to use?
    - Under what circumstances?
    - What would be the good and bad points of this?

5. Which activities in the Road Ready classes have you enjoyed?

6. Which activities in the Road Ready classes have you disliked?

7. There are many ways to teach young drivers and young passengers better ways to communicate. One way is to have people role play. One person acts as a driver and one as a passenger and they act out what they would say in a situation, such as when a passenger is asking the driver to slow down. The whole class then suggests how they could improve their communication.

    - How would you feel if you were asked to do a role play like this?
    - Would it be enjoyable?
    - Would it be valuable in helping you to communicate? Do you think that you would get anything out of it – learn anything?
    - What about if it was in a group of three people and you received suggestions only from the other two people in the group? Would this be better or worse than getting feedback from the whole class?

8. Another way is for the teacher to talk about different ways to communicate in a lecture style presentation.

    - How would you feel about this?
    - Would it be enjoyable?
    - Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

9. Another way is to watch a video of a driver and passenger interacting and to discuss whether they handled it well and to have a group discussion about other more effective ways that the driver and passenger could have communicated.

    - How would you feel about doing this sort of activity?
    - Would it be enjoyable?

- Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

10. It could also be possible to demonstrate the importance of teamwork by having people form teams and play video games. The games could only be won if everyone worked as a team.

    - What are your thoughts on this sort of activity? How would you feel about doing it?
    - Would it be enjoyable?
    - Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

Focus Group Discussion Guide for Provisional Drivers

1. There have been some suggestions that crashes involving young drivers while carrying passengers could be reduced if young drivers and passengers worked as a team.

   - Can you think of any examples where this might work?

   For example, passengers could be trained in how to ensure that a driver who is affected by alcohol or drugs doesn't drive. They could also be taught communication skills to persuade a driver to drive safely, and to help drivers by letting them know of any hazards that they didn't pick up.

   - What are your thoughts on this?
   - How do you feel about drivers and passengers acting as a team in this way?
   - Do you think it would work?
   - Would there be any problems? What sort?

2. Some drivers are reluctant to accept any input from passengers. Team training has been suggested to help drivers understand that passenger feedback can be helpful.

   How useful do you think this would be? Would you put this sort of training to use? Would it work? Will it depend on how the passenger communicates with the driver?

3. Passengers sometimes find it hard to find the right words to use to communicate with drivers. Team training for passengers to help them communicate more effectively with drivers when they feel unsafe has been suggested.

   For example, if the driver was speeding, the passengers could tell the driver in a number of ways how to slow down. The passenger could come right out and say "you are driving way too fast – slow down right now or stop the car so I can get out". Alternatively, the passenger could start off by saying something like "is the speed limit 60 km/h around here?". If that didn't work the passenger could explicitly ask the driver to slow down – "could you slow down a bit please?". If that didn't work, then the passenger could demand the driver slow down or stop the car so that the passenger can get out.

   - What do you think of this sort of approach?
   - Would it work?
   - Would you put this sort of training to use?

- What are some other sorts of communication strategies that young passengers can use to get their young drivers to drive safely?

4. Passengers could also be shown ways to communicate with drivers to let drivers know when they have missed something or haven't noticed something vital in the driving scene.

   - Would this work? Would you put this sort of training to use?
   - Under what circumstances?
   - What would be the good and bad points of this?

5. Which activities in the Road Ready Plus workshop you attended did you enjoy?

6. Which activities in the Road Ready Plus workshop you attended did you dislike?

7. There are many ways to train young drivers and young passengers better ways to communicate. One way is to have people role play. One person acts as a driver and one as a passenger and they act out what they would say in a situation, such as when a passenger is asking the driver to slow down. The whole group then suggests how they could improve their communication.

   - How would you feel if you were asked to do a role play like this?
   - Would it be enjoyable?
   - Would it be valuable in helping you to communicate? Do you think that you would get anything out of it – learn anything?
   - What about if it was in a group of three people and you received suggestions only from the other two people in the group? Would this be better or worse than getting feedback from the whole group?

8. Another way is for the workshop leader to talk about different ways to communicate in a lecture style presentation.

   - How would you feel about this?
   - Would it be enjoyable?
   - Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

9. Another way is to watch a video of a driver and passenger interacting and to discuss whether they handled it well and to have a group discussion about other more effective ways that the driver and passenger could have communicated.

   - How would you feel about doing this sort of activity?
   - Would it be enjoyable?

- Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

10. It could also be possible to demonstrate the importance of teamwork by having people form teams and play video games. The games could only be won if everyone worked as a team.

    - What are your thoughts on this sort of activity? How would you feel about doing it?
    - Would it be enjoyable?
    - Would it be valuable? Do you think that you would learn something from this approach? Do you think that you would get something out of it that you could then put to use?

Focus Group Discussion Guide for Road Ready Classroom Course Teachers

In discussing the issues that follow, keep in mind the people who you teach Road Ready to.

1. There have been some suggestions that crashes involving young drivers while carrying passengers could be reduced if young drivers and passengers worked as a team.

    - Can you think of any examples where this might work?

    For example, passengers could be trained in how to ensure that a driver who is affected by alcohol or drugs doesn't drive. They could also be taught communication skills to persuade a driver to drive safely, and to help drivers by letting them know of any hazards that they didn't pick up.

    - What are your thoughts on this?
    - Do you think it is an approach that would be acceptable to young people?
    - Do you think it would work?
    - Would there be any problems? What sort?

2. Some drivers are reluctant to accept any input from passengers. Team training has been suggested to help drivers understand that passenger feedback can be helpful.

    How useful do you think this would be for young people? Do you think that they would put this sort of training to use? Would it work? Will it depend on how the passenger communicates with the driver?

3. Passengers sometimes find it hard to find the right words to use to communicate with drivers. Team training for passengers to help them communicate more effectively with drivers when they feel unsafe has been suggested.

    For example, if the driver was speeding, the passengers could tell the driver in a number of ways how to slow down. The passenger could come right out and say "you are driving way too fast – slow down right now or stop the car so I can get out". Alternatively, the passenger could start off by saying something like "is the speed limit 60 km/h around here?". If that didn't work the passenger could explicitly ask the driver to slow down – "could you slow down a bit please?". If that didn't work, then the passenger could demand the driver slow down or stop the car so that the passenger can get out.

    - What do you think of this sort of approach for young people?

- Would it work?
- Do you think that they would put this sort of training to use?
- Do you know what sorts of communication strategies work well with young people?

4. Passengers could also be shown ways to communicate with drivers to let drivers know when they have missed something or haven't noticed something vital in the driving scene.

    - Would this work for young people? Do you think that they would put this sort of training to use?
    - Under what circumstances?
    - What would be the good and bad points of this?

5. In general, what sorts of activities or teaching techniques do you find work well with the age group that you teach Road Ready to? Which ones do the students enjoy the most? Which ones do they learn the most from?

6. In general, what sorts of activities or teaching techniques do you find don't work well with the age group that you teach Road Ready to? Which ones do the students dislike the most? Which ones do they learn the least from?

7. There are many ways to train young drivers and young passengers better ways to communicate. One way is to have people role play. One person acts as a driver and one as a passenger and they act out what they would say in a situation, such as when a passenger is asking the driver to slow down. The whole group then suggests how they could improve their communication.

    - How acceptable do you think this would be for young people?
    - What would it be like to teach?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?
    - What about if it was in a group of three people and they received suggestions only from the other two people in the group? Would this be better or worse than getting feedback from the whole group?

8. Another way is for the teacher to talk about different ways to communicate in a lecture style presentation.

    - How acceptable do you think this would be for young people?
    - What would it be like to teach?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?

9. Another way is to watch a video of a driver and passenger interacting and to discuss whether they handled it well and to have a group discussion about other more effective ways that the driver and passenger could have communicated.

    - How acceptable do you think this would be for young people?
    - What would it be like to teach?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?

10. It could also be possible to demonstrate the importance of teamwork by having people form teams and play video games. The games could only be won if everyone worked as a team.

    - How acceptable do you think this would be for young people?
    - What would it be like to teach?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?

Focus Group Discussion Guide for Road Ready Plus Course Facilitators

In discussing the issues that follow, keep in mind the people who come along to Road Ready Plus workshops.

1. There have been some suggestions that crashes involving young drivers while carrying passengers could be reduced if young drivers and passengers worked as a team.

    - Can you think of any examples where this might work?

    For example, passengers could be trained in how to ensure that a driver who is affected by alcohol or drugs doesn't drive. They could also be taught communication skills to persuade a driver to drive safely, and to help drivers by letting them know of any hazards that they didn't pick up.

    - What are your thoughts on this?
    - Do you think it is an approach that would be acceptable to young people?
    - Do you think it would work?
    - Would there be any problems? What sort?

2. Some drivers are reluctant to accept any input from passengers. Team training has been suggested to help drivers understand that passenger feedback can be helpful.

    How useful do you think this would be for young people? Do you think that they would put this sort of training to use? Would it work? Will it depend on how the passenger communicates with the driver?

3. Passengers sometimes find it hard to find the right words to use to communicate with drivers. Team training for passengers to help them communicate more effectively with drivers when they feel unsafe has been suggested.

    For example, if the driver was speeding, the passengers could tell the driver in a number of ways how to slow down. The passenger could come right out and say "you are driving way too fast – slow down right now or stop the car so I can get out". Alternatively, the passenger could start off by saying something like "is the speed limit 60 km/h around here?". If that didn't work the passenger could explicitly ask the driver to slow down – "could you slow down a bit please?". If that didn't work, then the passenger could demand the driver slow down or stop the car so that the passenger can get out.

    - What do you think of this sort of approach for young people?

- Would it work?
- Do you think that they would put this sort of training to use?
- Do you know what sorts of communication strategies work well with young people?

4. Passengers could also be shown ways to communicate with drivers to let drivers know when they have missed something or haven't noticed something vital in the driving scene.

    - Would this work for young people? Do you think that they would put this sort of training to use?
    - Under what circumstances?
    - What would be the good and bad points of this?

5. In general, what sorts of activities or techniques do you find work well with the age group that come along to Road Ready Plus workshops? Which ones do the participants enjoy the most? Which ones do they learn the most from?

6. In general, what sorts of activities or techniques do you find don't work well with the age group that come along to Road Ready Plus workshops? Which ones do the participants dislike the most? Which ones do they learn the least from?

7. There are many ways to train young drivers and young passengers better ways to communicate. One way is to have people role play. One person acts as a driver and one as a passenger and they act out what they would say in a situation, such as when a passenger is asking the driver to slow down. The whole group then suggests how they could improve their communication.

    - How acceptable do you think this would be for young people?
    - What would it be like to facilitate?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?
    - What about if it was in a group of three people and they received suggestions only from the other two people in the group? Would this be better or worse than getting feedback from the whole group?

8. Another way is for the group facilitator to talk about different ways to communicate in a lecture style presentation.

    - How acceptable do you think this would be for young people?
    - What would it be like to facilitate?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?

9. Another way is to watch a video of a driver and passenger interacting and to discuss whether they handled it well and to have a group discussion about other more effective ways that the driver and passenger could have communicated.

    - How acceptable do you think this would be for young people?
    - What would it be like to facilitate?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?

10. It could also be possible to demonstrate the importance of teamwork by having people form teams and play video games. The games could only be won if everyone worked as a team.

    - How acceptable do you think this would be for young people?
    - What would it be like to facilitate?
    - Would it work? Would it be valuable in helping young people to communicate more effectively? Do you think that they would get anything out of it – learn anything?