AN EXPLORATORY

TRAINING NEEDS ANALYSIS

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ABSTRACT

To adequately evaluate the content of a training programme the training material must be the same as, or as similar as that required to be utilised on the job. In addition, determining what trainees need to learn about a job (training needs analysis) must be undertaken before the evaluation of a programme. In this exploratory study, a training needs analysis was undertaken on a four-wheel drive (4WD) training programme and this was evaluated. Data from three separate training groups provided information for a training needs analysis and baseline data for a evaluation of the programme. Thirty six trainees were contacted and agreed to participate in the evaluation of the training programme.

The training needs analysis revealed ten skills and/or abilities which trainees were expected to learn and/or gain from the training. After a training programme, trainees had more knowledge of those skills and/or abilities, and had a more positive attitude towards their handling of, and driving of 4WD vehicles. The study also investigated attitudes towards safety (using the Safety Locus of Control scale) and driving violations (using the Attitudes to Driving Violations scale). Contrary to results of Jones and Wuebker (1993) and Marlatt and Marques (1977), training significantly reduced the trainees' attitudes towards safety indicating that they had become more externally oriented in their beliefs about safety. This finding also suggests that trainees believe safety is more a matter of circumstances (i.e., luck). Finally, the training needs analysis also revealed that trainees' knowledge of specific skills and/or abilities increased after training, and this attitude also significantly reduced trainees attitudes towards safety. Recommendations for the directions of future research were made.

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1. INTRODUCTION

The present exploratory study investigates an existing training programme for operators of four-wheel drive vehicles. An exploratory needs analysis and evaluation of a Company's training programme was undertaken. The Company runs training courses for operators of four-wheel drive fleet vehicles. The courses were developed by a four-wheel drive consultant for a major New Zealand car company in response to continuing demand for a course to teach people to drive competently off road. The aim of this study was to provide the Company with an independent review of their current training programme, and an opportunity to develop their programme in response to users needs, dependent on the findings of the study.

1.1 Training

Training is a process aimed at improving skills related to performance, and effective training programmes can result in increased production, reduced labour turnover, and greater employee satisfaction within industrial organisations (Blum & Naylor, 1968; Bass & Barrett, 1984). In the past, industry has attempted to address the problem of training employees in one of two ways. Companies have insisted on hiring skilled or experienced workers on the assumption that training will be unnecessary, or they have hired inexperienced people. These inexperienced employees are then turned over to experienced employees for training, under the belief that a worker who is experienced in their job can train an inexperienced person competently even though they have no knowledge of training techniques (Blum & Naylor, 1968).

There are numerous reasons behind modern management's expenditures of up to 10% of their budgets on personnel training and development. In the past, seniority

arrangements as well as pension plans made lifetime employment within a single firm common. Training expenditure was spent on encouraging employees to stay with the companies through providing training so that employees could progress up the ranks of the organisation (Bass & Barrett, 1984). Today, the position in organisations is for the opposite to occur, as employees expect to have a number of different jobs within their lifetime. Thus, training represents a positive hope for advancement, both for those first entering the work force and for those changing their work environment (Goldstein, 1991). Goldstein (1991) acknowledges that training programmes are big business, both in terms of the amount of effort expended and in money spent. Goldstein goes on to discuss the findings of a report by the Carnegie Foundation in the U.S.A.(Eurich, 1985) which indicated that education and training was becoming a thriving business itself, with industrial corporations spending more than $40 billion a year on programmes ranging from those addressing such basic skills as reading, to those that develop managers and executives.

Compounding the ongoing need for training within companies in today's world is the increasing pressure to hire disadvantaged people who may not have the usual minimum qualifications. This, in turn, places pressure on the hiring body to provide adequate training for these people to be brought up to the same level of competence as other employees. Moreover, as unskilled jobs are disappearing and being replaced by automated processes that require employees to have higher levels of competence to work in their jobs successfully, the training programmes developed need to provide more sophisticated knowledge, skills, attitudes and other organisational qualities, to enable employees to work as efficiently as possible, with minimal costs, and with the prospect of high return of investment in each employee (Goldstein, 1974, 1991). Further reasons for training may include global shifts in the economy such as from a

manufacturing to a service orientation. As many service jobs are labour intensive and not particularly amenable to automation, Goldstein (1991) implies that that there will be competition for entry-level workers, which will increase stress on training programmes to prepare the work force. Data indicate that the rate of work force increase will slow down significantly in the upcoming decades and that the number of new entrants will decrease substantially (Cascio & Zummuto, 1987; Fullerton, 1985, cited in Goldstein, 1991). This, in turn, will change the composition of the entry-level work force. Therefore, emphasis by organisations on the type of training needed to educate individuals for entering working roles is likely to be very high (Goldstein, 1991). An emphasis on utility is also affecting the training that organisations undertake. There has to be a foreseeable difference from before to after training, to justify money being spent.

How employees are trained can affect the outcome of a training program. Training new employees is different from training experienced employees who may need to unlearn some tasks and then relearn old tasks differently, but training usually provides opportunities for new learning (Landy, 1985). In developing training programmes, tasks are broken down, and trainees are taught how to do each part of the task effectively. Subsequently, as a result of time and experience, it is hoped that they will learn how to do multiple parts of a whole task to complete a job properly. Upgrading of skills requires employees to undertake training programs to familiarise themselves with new processes and production techniques.

As industry becomes more technologically oriented, each higher level employee is seen as an important investment to the employer. As new technical developments appear, these higher level employees, in particular, need to be refreshed. Training programmes themselves increase the 'attractiveness' of a firm to outsiders, by showing its

commitment to its employees through the willingness to spend money on their training. As a consequence of such attention to training, techniques of training are improving. Presently, there is greater willingness by companies to invest in training, as greater payoff to firms is recognised (Bass & Barrett, 1984).

Generally, training programmes are planned as a consequence of the prior experience and attitudes of the planners who, after setting the programme's objectives, design it, assuming the techniques they prescribe will move the trainee toward the stated objectives (Goldstein, 1974, 1991). There are several training approaches such as on-the-job training, near-the-job training, off-site training, apprentice training and job rotation. Characteristically, on-the-job training involves the whole job and one to one teaching with the employee, and near-the-job training may involve a replica of the work environment near the actual workplace. Off-site training often deals with only specific parts of the job or some skills relevant to the job. Off-site training can range from formal lectures to simulation training in similar circumstances to those of actual work conditions. Apprentice training involves a combination of on-the-job, near-the-job, and off-site training over a set number of hours. Job rotation involves the employee in taking turns at specific jobs within an organization, learning how to do that job effectively, and then after a set period of time moving on to another part of the work (Bass & Barrett, 1984; Landy, 1985; Goldstein, 1991). As Blum and Naylor (1968) indicated that training cannot entirely take the place of experience, but when training is effective it can shorten the time required to reach maximum production.

Very few training situations represent the actual job with perfect fidelity. One must understand the processes used in learning a skill in one situation and be able to transfer what is learned to a somewhat different skill in a somewhat different situation (Blum & Naylor, 1968; Goldstein, 1974, 1991). Transfer of training is defined as "*The extent to*

which trainees effectively apply the knowledge, skills, and attitudes gained in a training context back to the job" (Wexley and Latham, 1991). Considering the issue of transfer of training in industrial situations, Wexley and Latham (1991) provided the following suggestions for increasing the probability of transfer:

- Maximize the similarity between the training situation and the job situation
- Provide as much experience as possible, with the task being taught
- Provide for a variety of examples when teaching concepts or skills
- Label or identify important features of a task
- Make sure that general principles are understood
- Make sure that the trained behaviours and ideas are rewarded in the job situation
- Design the training content so that trainees can see its applicability.

Furthermore, transfer may be positive, when something previously learned benefits performance in a new situation, or negative, when previous learning hinders performance of learning in a new situation. Identical elements or the greater the number of elements in common between the training situation and real life experience, the greater the transfer between tasks (Tracey, Tannenbaum & Kavanagh, 1995).

In the present driver training courses, care is taken to maximise the similarities between the practical training conditions and actual environments that may be encountered.

1.2 Training Evaluation

Training evaluation deals with the basic issue of validity. Did the training accomplish what it purported to accomplish? Definitions of evaluation have been offered by a number of writers including Weiss (1975), Scriven (1972), Riecken (1977) and Goldstein (1980). The latter writer defines training evaluation as "*The systematic collection of descriptive and judgmental information necessary to make effective training decisions related to the selection, adoption, value and modification of various*

instructional activities" (Goldstein, 1980, p. 236). It is more an information gathering process than an attempt to identify the best training programme. It is one thing to evaluate a training programme, but it may be quite another thing to evaluate a method or technique. Training programmes often involve several methods, media or specific techniques, and when the overall effectiveness of the program is evaluated, little or nothing can be concluded about the component methods. Comparing two equivalent groups may assess the relative effectiveness of two methods or programmes with each trained group using one method or programme. The two groups are subsequently assessed on a common criterion measure or measures. Evaluation of the absolute effectiveness of these methods would require the use of an appropriate control group receiving no formal training. Usually the criterion of accomplishment is whether the trainees thought they learnt something, less often it is whether the trainee's superiors think the trainees learned something. Seldom is effectiveness based on actual measures of how much trainees learned.

Performance evaluation when done with sufficient frequency and in sufficient detail should pinpoint areas of substandard performance (Landy, 1985).

Kirkpatrick (1959, cited in Landy, 1985), suggested four criteria that are appropriate for training evaluation.

1. Reaction criteria which measures the impression gained by the trainees. Was the training valuable? Did they learn much? Did they enjoy the programme?
2. Learning criteria which measures how much was learned. These are typically gathered with traditional examinations.
3. Behavioural criteria which measure how much behaviour changed back on the job. The real question here is the extent to which transfer occurred from the training to the job.

4. Results criteria, which is a measure of payoff in organizational terms.

The choice of criteria should not simply be a matter of preference or convenience. Even though careful measurement of internal reaction criteria and learning in the context of an adequately designed study can provide valuable information to the trainer, these measurements cannot tell us what impact the training has on job behaviours or organizational goals. Evaluation of the payoff from a training programme depends not on what is learned in training, but on how and to what extent job behaviours and effectiveness are changed (Landy, 1985). This relates to efficiently teaching the appropriate knowledge, skills, attitudes and other organisational skills required in a job, to new employees.

Latham (1988) advocated the use of multiple-baseline designs to assess training effectiveness. However, the measurement of change across nonequivalent groups remains a complex problem (Arvey & Cole, 1989). The collection of pre- and post-training self-report data is common in evaluating training effectiveness. Most studies have shown that change scores based on retrospective assessments of pretest performance are more in agreement with objective indications of change than change scores based on independent pre-test measures (Sprangers & Hoogstraten, 1989). Retrospective recall measures may entail potential biases (Sprangers & Hoogstraten, 1989), as anybody can draw conclusions, which collaborate training results.

Despite the importance of assessing skill maintenance, there are no guidelines for determining the appropriate length of time to wait before collecting post-training measures. Research that collects outcome measures over several points in time allows one to understand skill decay better, and helps clarify when follow-up measures should

be collected and refresher training offered.

Kirkpatrick's (1976) typology remains the most prevalent framework for categorizing training criteria and includes four levels of training effectiveness: reactions, learning, behaviour and organizational results (Kirkpatrick, 1978). However, Alliger and Janak (1989) and Campion and Campion (1987), produced studies that failed to support the direct causal relationship among levels often assumed in Kirkpatrick's typology. In particular, trainee learning appears to be a necessary but not sufficient prerequisite for behaviour change. Furthermore, liking something did not imply that learning would occur. Campbell (1988) noted problems with the use of global measures of performance. Since training is but one of many factors that contribute to overall performance, global measures of performance can easily suffer from criterion contamination. Although skill development is often the primary goal of training, it is not necessarily the sole purpose (Brinkerhoff, 1986). Training can also contribute to team building, coalition building and culture building outcomes. Under certain circumstances, variables such as self-efficacy and organizational commitment may be valuable outcomes in their own right.

Today there is a greater emphasis on training within industry and companies in general. However, before an evaluation can be undertaken, one must know what are the current objectives and goals of training programmes. This process is called a needs analysis, and involves an objective investigation into what is currently being offered and what needs to be offered for trainees to be competent in their jobs. Needs are value judgements, and needs analysis is a tool for decision making in human services and education. Decisions that can be helped by needs analysis start with two judgements; (a) *services available to a population are (or are not) adequate;* and (b) if inadequate, *specific actions will correct the inadequacy.* Because there are usually many needs,

once needs are identified, they must be evaluated so that choices can be made among them. In the present study, trainees indicated how useful it would be to learn a specific skill/ability and also indicated how much they knew about that specific skill/ability before they undertook training.

A training programme should not be considered until a needs assessment has been completed. It is important to determine what the organizational training goals are and what the definition(s) of training success will be. Furthermore, it is important to know exactly what tasks are to be addressed in the training programme, to know who will take part in training and what should be done to tailor training to their particular needs. The present study focuses on this aspect of the training.

1.3 Training Needs Analysis

Needs analysis and programme evaluation have distinct roles to play in planning and managing human service and educational programmes. Programme evaluation addresses questions about the past: "What was done?" and "What was it worth?" Needs analysis addresses questions about the future: "What should be done?" Needs analysis explores present and future problems confronting a target population, what services are available, and what actions, if any, might be taken to remedy problems. Needs analysis points to deficits in a programme, but does not give guidance about the effectiveness of intervention strategies themselves. On the other hand, programme evaluation depends on needs analysis. If the worth of a programme is to be judged, the extent to which the programme addressed the needs of participants must be gauged. Without needs analysis programmes cannot be evaluated, they can only be described.

Needs analysis helps decision making by clarifying what and how important needs are.

It presumes that choices will be made among competing alternatives. Decision-making involves the actual choice among alternatives. Identifying needs presumes knowledge of the target population(s) and the services available to it. If this information is not at hand, it should be collected at the beginning of a needs analysis.

McKillip (1987) says that there are five steps involved in a comprehensive needs analysis. The first step for needs analysis, like that for all decision-aiding processes, is to identify the users and uses of the analysis, as neglect at this stage can lead to unused and unread reports. Knowing the uses of the needs analysis helps focus on the problems and solutions that can be entertained. The second factor to take into consideration involves geographic dispersion, transportation and demographic characteristics of the target population. Eligibility restrictions and service capacity are also important aspects of a needs analysis. A client analysis needs to be done comparing those who use the service with those who are eligible to use the service. Resource inventories, detailing the services that are currently available, which can determine the presence of competing and complimentary agencies should also be undertaken. Thirdly, problems of the target population(s) and possible solutions are described. Identification should include information on expectations for outcomes, current outcomes, and the impact and cost of solutions. The fourth step assesses the importance of the needs. Once problems and their solutions have been identified, needs are evaluated. Which are the most important for the target population? Which are the most relevant to the mission and experiences of the sponsoring agency? Needs analysis will be most useful for decision making if identified needs are evaluated against explicit and appropriate criteria. This is the task of needs assessment. Finally, the results of need identification must be communicated to decision-makers, users, and other relevant audiences. In practice, certain steps are emphasized more than others, depending on the requirements

experts in the field, examination of company records, critical incident technique, and interviews with people at different levels in the hierarchy, and climate questionnaires.

Person or man analysis as the second component, focuses on identifying who should be trained and what training is needed. There are two potential groups that should receive training, (a) those currently on the job who may be performing below expectations on one or more tasks, and (b) individuals who are about to perform the job for the first time. Inadequate person analysis can result in training targeted to an inappropriate level or to the wrong people. Further, person analysis can be used to assess whether employees have the prerequisite attitude, knowledge, and motivation to benefit from training. Individuals who lack basic skills or motivation prior to training are less likely to succeed and may require remedial preparation prior to entering a specific training programme. Latham (1988) also suggests doing a demographic analysis identifying sub-groups such as women, Maori or older employees who may require different types of training interventions.

Task analysis or operations analysis, as the last component of McGee and Thayer's 1961 categorisation, identifies the nature of the tasks, the knowledge, skills, abilities and other motivational aspects (KSAO's) that are required to perform the job satisfactorily. Task analysis also identifies those parts of a job that are the most frequently performed or important. Task analysis is used to determine the instructional objectives and results in a statement of the activities or work operations performed.

Increasingly, rapid technological changes can modify task requirements which, in turn, can influence knowledge, skill and ability requirements. These changes increase the need for cross job training. Campbell (1988) emphasised the need for a better

understanding of what is meant by competent or expert performance, thereby identifying differences in the way experts and novices approach a task and process information. Methods used in a task analysis include analysis of 'think-aloud' protocols and psychometric scaling techniques (Cooke & Schvaneveldt, 1988, cited in Tannenbaum & Yukl, 1992), and job analysis methods such as interviews with supervisors, encumbents, new encumbents, critical incident technique, repertory grid, checklists and observation. Particular attention must be focused on the standards of performance to be required of the employees, the tasks in which they will be engaged, the methods that will be used on the job, and how these methods and performances are learned (McGhee & Thayer, 1961, cited in Tannenbaum & Yukl, 1992). One must consider the component tasks involved in the operations whose learning is necessary to complete the final performance. Analyses aimed at establishing training requirements are based on the same kinds of information sources used to provide job descriptions: observation interviews with employees and their supervisors, and comparative studies by tests and surveys. The job requirements derived from these analyses consist of lists of those actual skill levels, aptitudes, and perhaps even personal characteristics needed for individuals to achieve at least average performance on specific jobs.

The impetus for training is usually an identification of a need for improvement. In most work settings, the process of needs assessment is poorly understood. To most managers, needs assessment means telling the personnel department that there are production problems and that maybe some people "need" training.

In respect to the present study, this researcher will rely on McGhee and Thayer's original categorisation (1961, cited in Tannenbaum & Yukl, 1992) which states there are three components required in needs analysis.

A complete organisational analysis cannot be undertaken in this study due to the unique nature of the training programme. The trainees in the programme are not all from the same work organisation or environment, so organisational analysis cannot be fully implemented. However, the trainees do provide the researcher with a rough estimate of their training requirements in their places of employment. Training obviously is needed when an employee is required to competently operate a four-wheel drive vehicle, and when their employer requires a recognised certificate for training in line with the Occupational Health and Safety Act of 1992. From an organisational point of view, evidence of transfer of training occurring in this case could be reflected through changes in maintenance costs on trainees' four-wheel drive vehicles, used in the work place. If before training, maintenance costs were high, and after training, maintenance costs were lower, this could indicate that a positive transfer of training had occurred.

In the present study, person analysis is limited to the particular groups of trainees who passed through the programme over a specified period of time, limited by the duration of the research. From this analysis the personal characteristics, safety attitudes, driving attitudes and abilities of the trainees' in the present study can be determined.

Task analysis is the third section of the present study. The trainees undertaking the training course came from a variety of different work organisations and environments, but with respect to the course, they will all need to acquire the same skills, knowledge and attitudes to prepare them for the tasks required in their places of employment. The task analysis identifies the sets of activities or work operations that trainees require in order to perform this particular aspect of their employment adequately. These requirements are encapsulated within the following guidelines set down for the four-wheel drive training courses.

1.4 The Training Courses

The Training Company runs courses for operators of four-wheel drive fleet and individual vehicles. A four-wheel drive consultant and senior lecturer in mechanical engineering, for a major New Zealand car company developed the course. The course was designed to promote the safe and responsible driving of four-wheel drive vehicles in off-road situations. During training, considerable emphasis is given to safety and hazard identification. Through theory and practical experience, trainees learn to identify and avoid hazardous situations leading to safer driving decisions in their work environment. The programme was launched in May 1996, and was aimed at fleet and commercial drivers. Courses were designed for both beginners as well as for those with experience with four-wheel drive vehicles. The programme is also structured to cater for all brands of four-wheel drive vehicles and to teach at three levels of proficiency.

Level One is an introductory course, which sets out to ensure drivers become familiar with four-wheel drive vehicles. If trainees do have some four-wheel drive experience, the programme will recognise it as prior learning (RPL). This level of training may be delivered using a suitably trained instructor, or alternatively, by an in-house staff member using a course package. The trainee must be capable of manoeuvring the vehicle in tight situations and understand how to operate the controls of the four-wheel drive vehicle that they are required to use at work.

Level Two, where the majority of training takes place, is composed of two modules: classroom instruction followed by on site tuition. The classroom module discusses the difference between four-wheel drive vehicles, conventional cars and light commercials. It also explains the workings of four-wheel drive transmission, advises on stability and

loading, and describes the elements of hazards of off-road driving. The on site module runs trainees through a succession of carefully planned activities each of which is designed to develop and assess a particular capability to a defined competency standard. The practical training site is pegged out so that up to nine trainees can be put through the programme in a full day without any training time being wasted.

Level Three is aimed at providing specific work related driving skills, and this advanced training is tailored to suit client requests. Depending on the content, such a course can take anywhere from half a day to a couple of days. Learning how to handle sand, ice and snow are typical requests.

The present evaluation study will be undertaken with trainees who are doing the Level Two training courses. This level gives the trainee fundamental off-road driving skills, and encourages the attitudes necessary for safe driving. The course is completed in one day, and consists of a two-hour indoor lecture period and a six-hour practical outdoor training activity. The study will focus on a training needs analysis for the Level Two course.

2. LITERATURE REVIEW

Training has been evaluated and investigated for many years, in terms of the effect it can have on trainees and their employers as well as related aspects such as risk-taking, accident rates (from motor vehicle to small accidents at work) and cost-benefit ratios. Driver training was developed after the introduction of the defensive driving courses of the 1980's. The effectiveness of motor cycle training has been assessed and results have been generalised to other types of driver training. The effect of personal characteristics such as motivation, attitudes and expectations of driving behaviour has been evaluated as well. Measures of personal attributes include the Safety Locus of Control (SLOC) Scale, which has been found to produce lower scores after training, indicating a move from an external to internal source of motivation, and the Attitudes to Driving Violations Scale (ADVS), a seven point measure which indicates whether a person has a positive or negative attitude towards safe driving practices. Differing techniques for evaluating trainees in courses, using a variety of measures to determine the make-up of those going through courses and what factors affect driving violations or attitudes to driving, have been investigated and linked to the effectiveness of training programmes. Needs analysis performed prior to training programme evaluations have had varying success in identifying the areas requiring training. Results have been mixed in supporting the use of training. Unless studies are undertaken with correct methodology and precise measurements, results can be biased and misleading to those who read them.

2.1 Causes of Traffic Accidents

In 1987, Mercer investigated the correlations between accident frequency and severity and socio-demographic data and restraint device usage in a vehicle. Mercer stated that "..., it is possible that decreases in accident severity and frequency per driven kilometre

could be attributed to increased restraint device use or to decreased drinking driving by the driving population as a whole." "Changes in traffic accident severity and frequency could also stem from changes in the demographic characteristics of the driving population." Mercer concluded that changes in unemployment levels arguably produced changes in driver demographics, which, in turn, appeared to be related more strongly to changes in accident frequency and severity than were changes in drinking driving and restraint device use. The study clearly showed that changes in accident figures must be considered within the context of economic trends and driver demographics in addition to driver-related behaviour such as restraint device use and drinking driving.

Other recent research such as Parker, West, Stradling and Manstead (1995) has shown risk of traffic accident involvement to be associated with the tendency to commit driving violations, fast driving, and a lack of thoroughness in decision making. Parker and colleagues further investigated the relationships between behavioural characteristics and involvement in different types of traffic accident. They reported studies examining the extent to which measures of one's tendency to commit violations (Driving Behaviour Questionnaire, DBQ), frequency of fast driving (Driving Style Questionnaire, DSQ), and thoroughness in making decisions (Decision Making Questionnaire, DMQ), are associated specifically with three accident types. They found that a high DBQ-violation score was associated with accidents in general. High DSQ-speed and low DMQ-thoroughness were associated with active not passive accidents, high DSQ-speed with active right of way violations, and low DMQ-thoroughness with active shunts and active right of way violations.

Later, in 1997, West and Hall further studied the role of personality and attitudes in

traffic accident risk. Utilising the Attitudes to Driving Violations Scale (ADVS), the Social Motivation Questionnaire (SMQ) which yielded a score of social deviance, and the speed sub-scale of the Driving Style Questionnaire (DSQ), West and Hall correlated self-reported fast driving and accident rates. The results indicated that drivers with a more positive attitude to driving violations and higher social deviance score drove faster and reported more accidents. Results also indicated the use of the ADVS as a marker of accident liability while replicating previous findings of an association between social deviance and accident rates.

There have been numerous attempts to relate personality factors to driving accidents and situations. A more comprehensive review can be found in Signori and Bowman (1974). Most studies develop descriptions of the problem driver by inventories of the personality characteristics of persons already determined to be problem drivers. But the usual personality tests do not predict problem driving. However, in 1985, McKelvey identified cognitive stereotypes, or anticipatory response dispositions toward driving tasks as important personality factors. He suggested that a questionnaire measuring problem drivers could include scales to assess the ability of individuals or groups to adapt to changes in the traffic control environment. Results of such measures could then be used to measure the effects of remedial training activities.

In 1988, McCormick and Allen evaluated the benefits, if any, of having vehicles fitted with single centrally mounted auxiliary stoplights. Cost benefit ratios were compared between vehicles in accidents that were not fitted with such lights and those vehicles in accidents that were fitted with such lights. They found that cost benefit ratios indicated the utility of fitting the auxiliary light at full retail price, even when only the cost of repairs and prevention is considered for the vehicle with the light.

Thus, while the incidence and severity of traffic accidents seems to be related to a variety of factors, including the use of safety devices, driving conditions, personal qualities and attitudes, the place of training remains a key concept.

2.2 Driver Training and Evaluation

In 1993, Jorgensen presented a paper that investigated car driver skills from an economist's point of view. He found that one could not judge the quality of a driving programme by its influence on accident rate alone, but that you also have to take into account that the course may change drivers' choice of speed and hence risk acceptance. Both of these ideas were combined by looking at the objective total costs per unit of distance. This cost index also enables one to discuss the impact of training on different types of driving skills, as defined by traffic psychologists, and on drivers' overall driving skills. Jorgensen found that Norwegian slippery surface driving courses significantly over-emphasized traffic accident rates. Jorgensen hypothesized that Norwegian car drivers seemed to overestimate driving risk prior to completing these courses, and that the reduction in risk perception following training overshadowed the objective improvements in driving. For example, a study to train people how to drive in icy conditions should focus on changing driving behaviour, rather than risk perception.

In 1997, Simonet and Wilde investigated the effect that driver training may have on the reduction of accident risk. They discovered that it is often believed that driver training will reduce accident risk without any substantive evidence and that because this belief is so strong in some countries, proof of driver training is demanded before a novice driver is allowed to take the test for driver licensing. On an empirical level, the evidence was rather discouraging. An investigation by Potvin, Champagne and

Laberge-Nadeau (1988) of the 1983 establishment of mandatory driver training courses in Quebec, found that there was no effect of the new law on the frequency or severity of accidents among newly licensed drivers who were 18 years or older. Meanwhile the risk of accidents actually increased among the 16-17 year olds (Simonet & Wilde, 1997).

In 1996, Gregersen, Brehmer and Moren evaluated road safety behaviour in large companies by comparing four different methods for reducing accident involvement through changed driver behaviour. These were; driver training, group discussions, campaigns and bonuses for accident free driving. Effects were calculated over a two year period (accident risk was assessed by the number of accidents in relation to mileage, and accident costs). Five groups were used, four groups who each took part in one of the methods, and the fifth group used as a control. Group discussions and driver training succeeded in reducing accident risk when compared to the control group. Overall the four methods had reduced accident costs when compared to the control group which did not change. However, the researchers noticed that many evaluation studies had failed to prove any safety effects of such training methods as those traditionally employed in training courses (braking techniques, how to handle a skidding car, and other skill specific techniques). A variety of explanations as to why driver training often fails to improve safety have been suggested. A common feature is the concept of behavioural adaptation. That is, the drivers make use of their improved driving skill not only for improved safety but also for purposes other than those intended, such as for more mobility, pleasure, being more adventurous, and the like. Another explanation is that drivers overestimate the safety effects of a training programme.

In 1990, Simpson and Mayhew undertook a study investigating the promotion of motorcycle safety through training, education and awareness. They pointed out that education and training are so fundamental to our way of life that the assumptions underlying them are rarely considered, let alone questioned. It is simply taken for granted that if a person does not possess the needed information or skill, these can be taught, presuming of course, that the individual possesses the minimum level of ability (intelligence, co-ordination, etc.) required to perform the task. It is also commonly believed that if the information /skill to be learned is presented in a systematic and organised manner by skilled instructors/teachers, it will be acquired more effectively. Formal instruction is assumed to be more effective and efficient than informal ('hit and miss'; 'trail and error') learning. In the traffic safety field this belief was instrumental in the growth of formal driver/rider education and training programmes. Motorcycle training programmes are really an extension of driver education/training courses that have been popular for decades.

Investigating the safety practices and injuries sustained by youth in Indiana who drove all terrain vehicles (ATV's), Tormoehlen and Sheldon (1996) found that 'friends' were the most frequent form of safety training, implying that there were no formal lessons given in safety while operating these vehicles. Results indicated that educational and regulatory efforts to prevent youths under the age of 16 from operating adult-sized ATV's had been largely ineffective and professional training was not utilised. A previous study by Lehto and Foley (1990) investigated risk-taking, warning labels, training and regulations with ATV users who wore helmets. Numerous associations between helmet use and riding habits and attitudes towards helmets were uncovered. Reduced use of helmets was associated with increased use of ATV's, and reduced use of helmets when riders had suffered injuries were significant findings that pointed

towards risky riding behaviours. Helmet usage was increased only when they were perceived as comfortable, when riders ordinarily used them on motorcycles and when riders were in areas where strict helmet wearing was reinforced. These results indicated that helmet wearing did not reflect riders' safety on vehicles, but were more inclined to be associated with riders' risk taking, as evidenced by the reduced use of helmets by many riders who had had accidents.

2.3 Transfer of Training

According to Tannenbaum and Yukl (1992) and Tracey et al. (1995), research involving the transfer of what is learned in a training environment that can be transferred to the actual work place highlighted the fact that the social support system plays a central role in the transfer of training. Various training related cues in the work environment could facilitate or hinder the application of newly trained behaviours for both new and experienced participants. It was widely accepted that transfer of learning will occur only when trainees have both the ability,(can do) and volition, (will do) to acquire and apply new skills (Wexley & Latham, 1991; Noe & Schmitt, 1986). Tannenbaum and Yukl (1992) cite researchers such as Williams, Thayer and Pond (1991), Tannenbaum, Mathieu and Salas (1991b) and Baldwin, Magjuka and Loher (1991) as all providing empirical evidence for a positive relationship between trainee motivation and training outcomes. Accordingly, Tannebaum and Yukl (1992) and Tracey et al. (1995) also found that other salient characteristics of the work environment, not directly related to training but more generally related to learning, also had an effect on the transfer of training.

In 1985, Lund and Williams reviewed the literature concerning defensive driving course (DDC) evaluations. Of 14 studies reviewed they found that only about one third

of the studies provided methodologically sound tests of DDC, and the remainder had design flaws that made their findings questionable or inadequate as tests of DDC. Only among the flawed test were there large, positive effects of DDC. In the methodologically strong tests, DDC had no consistent effect on crashes, but did decrease the frequency of traffic violations by about 10%. The failure of violation reductions to be translated into crash reductions may indicate that the violation reduction is an artifact of traffic record procedures or that the changes in driver behaviour, if real, were insufficient to modify individual crash likelihoods. Lund and Willaims (1985) found that the best evidence available did not support the hypothesis that DDC decreases the likelihood of motor vehicle crashes. Although less information was available on courses similar to DDC, they appeared to have similar limited effectiveness. Lund and Williams concluded that reliance on such courses to reduce highway losses was therefore unwarranted, at that time.

Komaki, Heinzmann and Lawson (1980) evaluated the effect of training and feedback in a component analysis of a behavioural safety programme implemented over a 45 week period. Evaluations found that when employees were rewarded for the correct behaviour either directly by supervisors, or in graphs that were posted showing a decline in accident rates, they continued to follow appropriate guidelines given during training for safe practices, during their working day. In 1989, McAfee and Winn critiqued the literature discussing the use of incentives/feedback to enhance work place safety. They discovered that all studies found that incentives or feedback were successful in improving safety conditions or reducing accidents, however there were limitations to these studies. By comparing the studies with a theoretical model that linked incentives/feedback with accidents and other end result variables, it became clear that much remained to be learned regarding the theoretical relationships between

incentives/knowledge of results and safe behaviour. This was because in most of the studies, both the independent and dependent variables were selected without reference to any conceptual model that clearly described and linked the variables involved.

More so now than ever, motorcycle safety is of increasing interest to all road researchers as accident rates for these road users continue to increase. Simpson and Mayhew (1990) and Mortimer (1988) both undertook studies investigating the further education of motorcycle users, and found that the few early evaluations which tended to produce encouraging results (formally trained riders having lower accident rates), suffered from some crucial methodological flaw that made the positive results obtained, questionable. However, further investigation in 1989 by McDavid, Lohrmann and Lohrmann resulted in more encouraging results. Using two matched groups in their study, from 1979 to 1984, with one group receiving formal training, while the other group did not, it was found that trained riders tended to have fewer accidents of all kinds (all motor vehicles accidents combined), fewer motorcycle accidents and less severe motorcycle accidents. These results suggested that when care is taken to carefully match trained and untrained riders, training is associated with a reduction in accidents. The evidence from the study supported the use of training as a means of reducing the human and material costs of motorcycle accidents. Generalising from these results, one could say that training was effective in the safety performance of the participants. These results may therefore be generalised to driver training of all types.

Noe and Schmitt (1986), had already found that a variety of factors besides ability can influence training effectiveness, including trainee motivation, attitudes, and expectations. Little, if any, progress can occur without motivation (Blum & Naylor, 1968). For example, an average person can be trained to conduct a conversation in a

foreign language in a matter of months if they are in a situation where communication is important, compared to students taking three years in school. Most of this difference is due to the increased motivation of trainees. Effective motivation is the essence of learning. At the same time Bandura (1986) pointed out that the belief in one's ability to perform a specific task (self-efficacy) is a central concept in social learning theory. Individuals who are trained with the belief that they can successfully perform the task they have been trained to do should be more resilient when they encounter obstacles in the transfer environment.

Despite the apparently overwhelming evidence, it could be contended that the value and potential of driver/rider training/education remains untested. Evaluation's preoccupation with, and narrow view of accident reduction has meant that positive bottom line effects may have gone undetected. Moreover, important intermediate programme objectives (i.e. increasing the skills levels of trainees and reducing injury severity, in a collision) have not been adequately tested and the extent to which some participants may benefit from the programme while others may not, remains to be pursued.

2.4 Training Needs Analysis

In 1978, Moore and Dutton critically reviewed all aspects of training needs analysis (TNA) data resources, measures and research techniques. They found that the field of training needs analysis as a scholarly endeavour suffered from several major deficiencies at that time and summarized their findings by stating that TNA was not currently being performed as most training theorists had suggested that it should be.

Smith, Delahaye and Gates (1986) examined several reasons why TNA was often a

difficult process for trainers. In many trainers' experience, TNA is not done, or is not done effectively. Time pressures, expectations by management and the need to sell TNA were a few of the reasons on offer for this lack of analysis. Moreover, other factors inherent in TNA can make the process difficult and/or ineffective. Smith and colleagues examined the following three factors; lack of an adequate model or conceptualization leading to omissions and misdirected efforts, unneccessarily restrictive views concerning what data is available and is appropriate to a TNA , thus limiting effectiveness, and lack of a relatively objective process for choosing TNA data gathering methods producing confusion, followed by guess work or inaction. They proposed a three-stage model of surveillance, investigation and analysis and a reading list to assist trainers in their next TNA efforts.

In 1987, Hiebert and Smallwood investigated the differences between the objectivist and interpretive approaches to training needs analysis. They listed certain situations when each of the approaches should be used. Conditions for the traditional objectivist approach would be; certainty, relatively unchanging environment, content is clear, training skills can be clearly described behaviourally, means and ends are clear, discrete and measurable and there is a clear distinction between training and organization development (OD) activities. The objectivist approach would be useful in training technical skills, engineering skills and mechanical skills and used methods like competency models and written surveys. Conditions for the non-traditional interpretive approach would be opposite to those listed for the objectivist approach and would be used in much of management and supervisory training and leadership training. Appropriate methods would include sensing meetings, one-on-one interviews and training needs agreed to by mutual interpretation and agreement.

In 1990, Herbert and Doverspike investigated the use of performance appraisal information as a technique for person analysis, and needs analysis in general. After reviewing the literature on performance appraisal and needs analysis, they found a lack of attention to the goals of the needs analysis process in 28 different pieces of literature spanning two decades, from 1965 to 1985. The call for needs analysis grew out of a realization that inadequate and incomplete specification of training needs is likely to result in similarly inadequate training programmes, and continued performance deficiencies.

In the present study a training needs analysis was conducted using a variety of measures aimed at determining the personal characteristics, safety attitudes, driving attitudes and abilities of those trainees undertaking the training courses. In addition, information was also gathered on each trainee's area of employment, any other training they may have undertaken and accident histories. In the remainder of this chapter, we review the literature on the measures relevant to the training needs analysis, implemented in the present study.

2.4.1 *Safety Locus of Control Scale*

The Safety Locus of Control (SLOC) Scale is a further extension of the Health Locus of Control (HLC) Scale (Wallston, Wallston, Kaplan & Maides, 1976). The HLC scale is an area specific measure of expectancies regarding locus of control, developed for the prediction of health-related behaviour. Wallston et al. (1976) found the HLC scale to have discriminant validity in two experiments. The HLC differed from Rotter's (1966), Internal-External Locus of Control Scale as Rotter uses measures of generalized expectancies and the HLC is an area specific scale.

The link between perceived locus of control and safety becomes clearer when considering what Rotter (1960) found.

Rotter found that the individual who has strong belief that [they] control their own destiny is more likely to have superior cognitive processing activities. They seem to acquire more information, make more attempts at acquiring it, are better at retaining it, are less satisfied with the amount of information they possess, are better at utilizing information and devising rules to process it, and generally pay more attention to relevant cues in the situation.

In 1983, Jones developed the Safety Locus of Control (SLOC) Scale, a paper and pencil inventory designed to identify those employees at risk for accidents, injuries, and unsafe behaviour in the workplace. The scale is based on a personality construct called "locus of control," which reflects the degree to which an individual perceives that the consequences of behaviour and life events are in his or her control. On a continuum ranging from internal to external, internally oriented individuals expect a contingent relationship between personal behaviour and consequences. Externally oriented persons, however, see no cause-and-effect relationship between personal actions and outcome. The SLOC scale is a situation specific scale with items referenced to industrial accidents and accidents in general.

In its initial development seventeen face-valid items were selected from a pool of 32 items to form the SLOC scale (Jones & Wuebker, 1985a). All items were written to measure safety-related locus of control beliefs. Ten externally oriented and seven internally oriented items were selected. Eleven items made reference to industrial accidents (e.g., "Occupational accidents and injuries occur because employees do not take enough interest in safety."), and six items made reference to accidents in general

(e.g., "Most accidents are unavoidable."). Each item was judged to be face valid by five certified safety professionals and by two licensed psychologists specializing in industrial loss control. Some examples of externally oriented items include beliefs that: (1) Accidents and injuries are caused by chance happenings (e.g., "Whether people get injured or not is a matter of fate, chance, or luck"); (2) Overt behaviour and subsequent personal safety are unrelated (e.g., "No matter how hard employees try to prevent them, there will always be on-the-job accidents"); and (3) Somebody or something other than oneself is responsible for accident prevention (e.g., "It is the company's responsibility to prevent all accidents at work"). Some examples of internally directed items include beliefs that: (1) Accidents are caused by human carelessness (e.g., "Most industrial accidents are due to employees' carelessness"); (2) Overt behaviour and subsequent personal safety are highly related (e.g., "If employees follow all company rules and regulations, they can avoid many on-the-job accidents"); and (3) accidents are controllable (e.g., "Most accidents that result in injuries to employees are largely preventable").

A six-point Likert-type scale, ranging from "Agree Very Much" to "Disagree Very Much," was used for each of the 17 items. The median was found for each item, and then each person's individual score on that item was given a –1, 0, or +1, dependent on that item's median split. That is, item scores below the median in the external direction were scored –1, item scores above the median in the internal direction were scored +1, and item scores at the median were scored 0. Hence, scores on the scale can range from –17 to +17, with higher scores indicating more internality.

In this same study (1985a) Jones and Wuebker investigated the effect of safety training on safety locus of control beliefs. Fifteen safety professionals involved in the

development and implementation of industrial accident-prevention programmes for a major insurance company completed the SLOC scale, and comparative scores between the safety professionals and five criterion groups of non-safety professionals showed that the safety professionals were significantly ($p < .05$), more internal in their safety control beliefs. An additional exploratory analysis of the safety professionals revealed that the mean safety score of the 3 highly experienced officers was significantly ($p < .04$) more internally oriented than that of the other 12 safety professionals.

Although a comparison between the non-safety and safety professionals was risky due to the dissimilarity of the samples, the results of these analyses suggested that safety training may be related to safety locus of control beliefs. That is, higher levels or amounts of safety training may be associated with increased internality in safety locus of control beliefs. Such conclusions were consistent with other research showing that appropriate training and education can contribute to more internal locus of control orientations (Jones, 1983; Marlatt & Marques, 1977).

In 1984, Jones and Foreman (cited in Jones & Wuebker, 1985a) investigated the relationship of the safety-scale scores to state motor vehicle accident reports (MVRs) for 46 bus driver applicants. Applicants were rated as being *lower* risks in terms of their driving safety if no incidents or one very minor incident of unsafe driving behaviour were recorded on their MVRs. Applicants in the *high* risk group typically had two or more convictions for unsafe driving, including speeding, running stop signs, causing accidents, driving on the wrong side of the road, and/or driving while intoxicated. Results showed that approximately 79% (11/14) of the applicants with substandard scale scores were classified as high-risk drivers, compared to only 31% (10/32) who were classified as low-risk drivers by their scores.

Another study by Jones (1985), demonstrated the relationship between safety locus of control beliefs and employee dishonesty with 124 hotel job applicants. In addition to completing the Safety Locus of Control Scale, the applicants were also given the Personnel Selection Inventory (London House Press, 1983: cited in Jones, 1995), a measure of potential for employee crime and counter-productivity. The results showed that applicants who were at high risk of engaging in on-the-job theft, violence, and/or drug abuse tended to have more external safety locus of control orientations.

The construct validity of the SLOC scale was examined by Wuebker in 1986. Wuebker found that safety scale scores of 1732 employment applicants significantly correlated ($p < .001$ in all cases) with psychological measures of dishonesty ($r = .31$), violence ($r = .29$) and drug abuse potential ($r = .18$). Wuebker concluded that poor safety scores seemed to be related to a more general "counter-productivity" factor. That is, employees at risk for accidents appear to be at a slightly greater risk of breaking company rules, causing damage and waste to property, and using illicit drugs at work.

Jones (1985) and Jones and Wuebker (1985a) offered preliminary evidence of the concurrent, criterion-related validity of the SLOC scale. In these studies, the scale was reliable in discriminating between employees in the criterion groups. As a result, a number of conclusions at that time were possible. First, externally oriented employees had significantly more accidents than employees with internal safety control beliefs. Second, not only did externally oriented employees have more accidents and injuries, but they also had more major accidents and injuries than internally oriented employees.

Later in 1985, Wuebker, Jones and Dubois further validated the SLOC scale by replicating and extending the Jones and Wuebker (1985a) study in the hotel industry. It

was hypothesized that employees experiencing major accidents or serious near-miss accidents, along with employees terminated for poor safety practices, would be more externally oriented in their safety beliefs (as measured by the SLC scale) when compared to employees reporting no accidents or very minor accidents. The *Low Accident Risk* group obtained a mean safety scale score of + 0.16 (*SD* = 6.20), and the *High Accident Risk* group obtained a mean scale score of – 4.00 (*SD* = 5.90). A *t*-test for means of independent samples revealed that the difference between the two criterion groups was statistically significant (t [118] = 2.56, $p < .02$). Therefore the scale was reliable in discriminating between employees in the two criterion groups.

Other research provides evidence of the validity of the SLOC scale. A similar study to those undertaken by Jones and Wuebker (1985a) and Wuebker, Jones and Dubois (1985) was conducted by Jones and Wuebker later in 1985 (1985b). In this study 283 hospital employees completed the SLOC scale in addition to the Employee Injury Profile, a checklist that assesses major occupational accidents and injuries incurred by the employees over the preceding twelve month period. Employees were placed in three different groups based on their safety scale scores (1) *Low Safety Conscious* group: employees scoring below the 25th percentile, indicating external safety control beliefs (2) *High Safety Conscious* group: employees scoring above the 75th percentile, indicating an internal safety orientation, and (3) *Medium Safety Conscious* group: employees with intermediate safety scale scores.

The results showed that the average number of reported industrial accidents per year were significantly higher for the Low Safety Conscious group (M = 1.13, SD = 1,81) as compared to the Medium Safety Conscious group (M = 0.71, SD = 1.41) and the High Safety Conscious group (M = 0.38, SD = 0.99). It was also found that employees in the

Low Safety Conscious group reported significantly higher estimates of medical costs (M = $346, SD = $806) as compared to the Medium (M = $148, SD = $388) and High (M = $131, SD = $474) Safety Conscious groups. In addition, it was found that a significantly higher percentage of the Low Safety Conscious group (38%) were involved in one or more major accidents at work, compared to the Medium (28%) and High (21%) Safety Conscious groups.

In 1993, Jones and Wuebker further validated the SLOC scale. Safety scores were correlated with hospital employees' self-reports of their major on-the-job accidents along with the estimated medical costs associated with these accidents. It was found that employees exhibiting *low* levels of safety consciousness (i.e. external scores) would report significantly more accidents than employees exhibiting *high* levels of safety consciousness (i.e. internal scores). The SLOC scale was accepted as being conceivably able to provide industry with a standardized measure of safety consciousness, and it was suggested that the scale could be used as part of a comprehensive personnel selection battery designed to screen employment applicants for safety-sensitive positions.

In the present study, the SLOC scale comprising of 17 items was used to calculate each trainees' safety score before they undertook the training course.

2.4.2 *Attitudes to Driving Violations Scale*

The Attitudes to Driving violations Scale (ADVS) was developed by giving a larger questionnaire to a sample of 105 students (mean age 21 years, 49% male), and removing items until further removal of items resulted in no improvement in the coefficient alpha for the scale (West & Hall, 1997). The coefficient alpha on that

sample was .71. In 1997, West and Hall undertook further studies which utilised the attitudes to driving violations scale, and obtained an alpha of .76. Ratings provide a score of 5 = strongly disagree to 1 = strongly agree and a total score is computed for the attitude to driving violations scale. To examine the practical value of the ADVS in predicting accident risk, scores on the questionnaire were categorised into three bands: scores under 15 indicated general agreement with the statements and were coded as 1; scores between 15 and 21 indicated a neutral stance on the statements and were coded as 2; scores above 21 indicated disagreement with the statements, indicating a more positive attitude to driving violations, and were coded as 3. In conclusion, the study found that attitudes to driving violations can be measured by a simple 7-item scale that predicts accidents over and above socio-demographic variables and self-reported driving speed. Therefore, this scale may be of value in identifying high-risk drivers.

Due to the possible link between scores on the ADVS and the SLOC scale and the reasonable internal consistency of the ADVS, the ADVS was used in the present research.

2.4.3 *Vehicle Accident Category Scale*

Stanislaw (1987) investigated methodological considerations for the assessment of traffic safety trends and interventions because long term trends in traffic safety were usually modelled by regressing the fatal accident rate on time. Safety interventions were then assessed by evaluating their impact relative to baseline trends. However, Stanislaw found this approach confounded the accident rate with the fatality rate and introduced a number of statistical problems.

Different time periods in which data has been collected have been used over the years

such as Mercer and Jeffery's (1995) traffic accident frequency. This was the number of accidents drawn from the British Columbia Motor Vehicle Branch database in Canada over a five-year period. Similarly, Stoohs, Guilleminaunlt, Itoi and Dement (1994) found the frequency of automotive accidents for their study sample from the number of driving accidents they were involved in over the last five years. DiFranza, Winters, Goldberg, Grillo and Billiouris (1986) used only a one year time period in which subjects were to indicate if they had been involved in any accidents.

In the present study, accidents were reported by asking drivers to indicate how many accidents they had been involved in over the last three years. The format of the question was identical to that used in previous national surveys (Maycock, Lockwood & Lester, 1991; cited in West & Hall, 1997, and French, West, Elander & Wilding, 1993). This contrasts with Lang, Waller and Shope (1996), who utilised a more straightforward but less controlled approach to collecting driver history data. Crash counts were 1 (having had one or more crashes), and 0 (having had no crashes). Such examples illustrate the diversity of how a respondent's accident frequency history is determined.

2.4.4 *Vehicle Accident Type Scale*

In the present study of those people who have had accidents, a distinction was made between active and passive accidents. Active shunt, active right of way violation, active reversing and loss of control were all deemed to be the fault of the person driving the vehicle. This means that the driver could have avoided the accident occurring. Passive shunt, passive right of way and passive reversing were accidents that happened to the vehicle that the person was driving. West and Hall (1997) used this distinction which was developed from previous research classifying accidents from

driver's self-reports (West, in press; cited in West & Hall, 1997). West and Hall found that attitudes to violations were significantly and independently associated with accidents in general, active accidents, active shunts, and active reversing accidents. They concluded that their results reinforced the view that driving style and driving related attitudes are related to broader personality characteristics.

2.4.5 *Measures of Accident and Injury Severity*

Over the years, there have been many different research methods used to assess the severity of motor vehicle accidents and the severity of injury received by people involved in motor vehicle accidents. Mercer and Jeffery (1995), Sorock, Ranney and Lehto (1996), Rutledge and Stutts (1993), and Conn, Chorba, Peterson, Rhodes and Annest (1993), are just some of the studies that have used a variety of different research techniques to determine motor vehicle accident severity and injury severity over the years.

2.4.5.1 Accident Severity Scale

There have been several different methods used to identify how severe traffic accidents are. In 1995, Mercer and Jeffery conducted a study investigating patterns of convictions and traffic accident involvement. In doing so, they explored traffic accident severity by utilizing a four unit scale of severity consisting of 'property damage only', an 'injury only accident', a 'fatal accident' and a 'no injury accident'. On this scale they found factor scores for the groups under investigation, and divided the groups into 'low', 'medium' and 'high' categories. Thus a 'low' score referred to a low score relative to the normative sample and not simply low within the accident-defined group. Mercer and Jeffery designed this scale themselves, and did not get their information from the people involved in these accidents directly, but from driver's

conviction histories over a five year period from the British Columbia Motor vehicle Branch database in Canada.

Sorock et al. (1996) used a six crash type scale for motor vehicle crashes in their study. These were 'rear end', 'hit object (small)', 'hit object (large)', 'side impact', 'flip/overturn', and 'not specified'. Kim, Nitz, Richardson and Li (1995) used only a three type crash severity variable. These were 'head-on', 'roll over', and 'other'.

In 1986, DiFranza, Winters, Goldberg, Grillo and Billiouris distinguished a time frame from within which subjects were to answer questions on their self-administered questionnaires. For DiFranza et al. it was the year preceding the time that the subjects completed the questionnaire. They distinguished between how many accidents each person in their study had had; from 'no accidents', to 'one accident', to 'more than one accident'.

Reinfurt, Green, Campbell and Williams (1994), used the TAD vehicle damage rating scale (National Safety Council, 1984; cited in Reinfurt et al., 1994), which is based on photographs of damaged vehicles by location and extent of damage, thereby providing both the area of primary damage (e.g. front distributed), and relative extent of damage from Level 1 (least damage), to Level 7 (most damage).

The above studies indicated that there is no single accepted scale on which to rate severity of motor vehicle accidents. Thus, the researcher designed an accident severity scale for the present study which comprised of seven different levels of severity, from " There was no damage to the vehicle I was in", to "The vehicle I was in was written off (could no longer be driven)". Trainees were required to indicate the degree of severity

for any motor vehicle accidents they were involved in by placing a mark in the box at the end of each level that represented their accident most accurately.

2.4.5.2 Injury Severity Scale

Conn et al. (1993), MacKay, Hill, Parkin and Munns (1993), Rutledge and Stutts (1993), and Stoduto et al. (1993) determined subjects' injury severity by employing the Abbreviated Injury Score (AIS). The AIS manual assigns a numerical score of 1 (a minor injury) to 6 (a virtually unsurvivable injury) to denote the severity of injury for each of nine identified body regions (American Association for Automotive Medicine, A.A.A.M., 1985; cited in MacKay et al., 1993). In the studies of Conn and colleagues (1993), MacKay et al. (1993), Rutledge and Stutts (1993) and Stoduto et al. (1993), the highest numerical scores, squared, for up to three body regions were then summed to obtain the injured person's Injury Severity Score (ISS). A score ≥ 9 was deemed to be a serious injury. They did, however, point out that... "Although an ISS of 9 could indicate one serious injury, or two moderate injuries and one minor injury, we (they) chose this value because patients with an AIS of 3 are considered by the American Association of Automotive Medicine to have a serious injury; and a total AIS of 3 is equivalent to an ISS of 9."

Other simpler methods of distinguishing between different injury severity types were employed by Wagenaar and Maybee (1986), whereby there were only three different crash types. These were 'serious injury' (at least one fatality or incapacitating injury), 'minor injury' (crashes causing non-incapacitating or possible injuries), and 'property damage only' (no injuries reported). Reinfurt et al. used a somewhat more intricate classification system in their 1994 study involving crash (accident) severity and injury severity. The studies of Reinfurt et al. (1994) and Pack et al. (1995) both used the

KABCO Scale (National safety Council, 1976; cited in Reinfurt et al., 1994) to classify injury severity. This scale referred to; K = killed, A = incapacitating (e.g. massive loss of blood, broken bone, unconsciousness of more than momentary duration), B = non-incapacitating (e.g. bruises, swelling, limping), C = complaint of pain or momentary unconsciousness, O = no injury. In 1995, Kim et al. based their injury severity variable on the KABCO Scale. They combined A and B together to form a four point scale. Crashes with injury were 1 (having had at least one crash with injury), and 0 (having had no crashes with injury). Single vehicle crashes were grouped as 1 (one or more), and 0 (had none).

Ringwalt, DeVellis, Runyan, DeVellis and Wittenbraker (1986), employed a five point scale for parents to rate possible injuries of children involved in a car crash. These were (i) minor injuries (ii) serious injuries such as broken bones (iii) permanent disabilities such as brain damage or paralysis (iv) death and (v) no injury.

There are a myriad of different classification systems for injury severity, from a simple 'non injury' to 'fatality', using a basic three step identification technique, through to 'specific identification of damage sustained from accidents by using detailed photographs'. Therefore it was decided to construct a scale purely for use in this study, and for possible use in other research on traffic accident severity (automobiles and people). As the prospective sample to be used in the study would most likely not have access to photographs of any accidents they had been in, and would not necessarily remember if the accident was 'incapacitating' or 'non-incapacitating' to any persons involved, the scale developed by the researcher was simple and straight forward for respondents to answer, could be easily coded and was sufficiently detailed for the present purposes.

2.5 Research Questions

As a result of the preceding review of the literature, the following research questions were formulated for the present study. Answers to these questions would help to facilitate a Training Needs Analysis focussing on the three components of Person Analysis, Organisational Analysis and Task Analysis.

Person Analysis

1. What are the personal characteristics of trainees who participated in 4WD courses?
2. What 4WD experience and ability do trainees have before training?
3. Do the trainees belief in their handling of a 4WD vehicle, change after training?
4. Do the trainees belief in their driving ability in a 4WD vehicle, change after training?
5. Do trainees Safety Locus of Control Scale scores remain constant after training?
6. Do trainees Attitude to Driving Violations Scale scores remain constant after training?
7. Is there a link between Accident Rate, Type and Severity, Injury Severity and Attitudes to Driving Violations Scale scores?

Organisational Analysis

8. Why do trainees participate in the training courses?
9. To what extent do trainees perceive a need for training?

Task Analysis

10. What skills and/or abilities do trainees expect to learn and/or gain from the training?
11. How useful do trainees believe these skills and/or abilities are to learn and/or gain?
12. How much do trainees know about each skill and/or ability prior to training?
13. Have trainees knowledge of each skill and/or ability changed after training?

3. METHOD

3.1 Pilot Study

A pilot study was conducted prior to the main study to make sure respondents; a) understood the language used in the questionnaire, b) knew where and how to answer questions, and c) for respondents to comment on any area of the questionnaire that they thought may need to be changed. The four members of the pilot sample, none of whom would participate in the main study, were between 23 and 53 years of age. All were male, either married or de facto married, half having 3 or more children and the remainder having no children. All four members of the pilot sample had experienced driving a four-wheel drive vehicle with three having had a little previous four-wheel drive training. Each pilot member was given a copy of questionnaire 1 (Q.1A) to complete, and invited to comment on the questionnaire if they deemed changes were necessary for reasons such as; difficult to understand, unclear on what is required, or other errors. There were no problems encountered by this preliminary group of participants, and the questionnaire was not changed before being distributed to the trainees in the main study.

3.2 Main Study

3.2.1 *Sample*

The main study began in October 1997. The population from which the sample was derived consisted only of those available trainees who were scheduled to undertake the company's Level 2, 4WD training courses between October 1 and December 18, 1997. This method of selecting participants constitutes a 'random probability convenience sample', and was necessary due to the specialized nature of the course and the strict time limits placed on the researcher. The sampling frame consisted of those trainees

whose superiors were approached by The Training Company on behalf of the researcher. Participants were those trainees who accepted an invitation to participate in the research after having the reasons behind the research fully explained to their satisfaction. There was a total of 37 Q.1A's distributed to trainees', but only 14 were returned. Thus giving a response rate of 38%.

The 14 trainees ranged in age from 26 to 56 years old, with a mean age of 36 years, 1 month, and standard deviation of 10 years, 2 months. There were three female trainees, ranging in age from 28 to 29 years old, with a mean age of 28 years, 4 months, and standard deviation of 7 months. Nine male trainees ranged in age from 26 to 56 years, with a mean age of 38 years, 3 months, and a standard deviation of 10 years, 7 months (Note: Two males did not indicate their age).

Nine trainees identified themselves as New Zealand European, two as New Zealand Maori, and the remaining three as 'other' ethnicity.

3.2.2 *Measures*

Three questionnaires were distributed to each trainee during the present study. The first was identified as Q.1A, the second as Q.1B, and the third as Q.2. The researcher designed portions of Q.1A to cover areas for which no standard measures existed.

Q.1A consisted of socio-demographic information questions to identify sample characteristics. Measures of personal attitudes were made using the Safety Locus of Control (SLOC) scale (Jones, 1983), Attitudes to Driving Violations Scale (ADVS; West & Hall, 1997), and the active/passive accident type scale (West, in press; cited in West & Hall, 1997). A Vehicle Accident Information Scale, and an Injury and Accident Severity Scale were designed by the researcher to measure the degree of damage and injury suffered by both vehicles and people involved in accidents over the

last three years. Another scale was also used to gauge trainees' self-report abilities in driving 4WD vehicles. Trainees also indicated how many accidents they had had over the last three years. The last page of the questionnaire asked trainees to list the common skills and/or abilities that they expected to learn/gain from the course.

All three versions of Q.1B, one for each course, consisted of those common skills and/or abilities those trainees had listed in Q.1A. Trainees were required to indicate on a 5-point scale how much they knew about each skill and/or ability, and how useful learning each skill and/or ability would be.

Q.2 consisted of the SLOC scale, the ADVS scale, the 4WD ability scale and the knowledge section of Q.1B.

Copies of the questionnaires that were used in the research are included in Appendices C, D and F.

3.2.2.1 Safety Locus of Control (SLOC) Scale (Jones, 1983)

As discussed in chapter 2, Jones developed the SLOC scale in 1983. Jones developed the SLOC scale to identify employees at risk for accidents, injuries and unsafe practices in the workplace.

Based on the personality construct 'locus of control', the SLOC scale reflects the degree to which an individual perceives that the consequences of behaviour are under their control. On a continuum ranging from internal to external, internally oriented individuals expect a contingent relationship between personal behaviour and consequences, whereas externally oriented persons see no cause-and-effect relationship between personal actions and outcome. The SLOC scale is a situation specific scale with items referenced to industrial accidents and accidents in general. Responses are made by indicating at the end of each of 17 items how much you agree or disagree with it, using a six-point Likert type scale. Responses ranged from "Agree Very Much" to

"Disagree Very Much". The scoring system was a replication of that used by Wuebker, (1986), in which scores were graded –1, 0, or +1 dependent on whether they were less than, equal to or greater than the median split score for each item. Scores therefore ranged from –17 to +17.

3.2.2.2 Attitudes to Driving Violations Scale (ADVS) (West & Hall, 1997)

This scale assessed each trainee's attitude to driving violations. Trainees indicated how much they agreed or disagreed with each of seven statements on a five-point scale, ranging from 5=strongly disagree to 1=strongly agree. Totals for each of the seven statements were grouped into 'below 15', '15 to 21', and 'above 21' scores. Each group, respectively, indicated an increasing agreement with the statements. More agreement with the statements reflects a less than desirable attitude towards driving

This particular scale was included in the study following from research by West and Hall (1997) which indicated that drivers with a more positive attitude to driving violations when coupled with higher levels of social deviance, reported having more accidents. It was proposed that there would be a relationship between drivers with a more positive attitude to driving violations and those reporting higher levels of accidents.

3.2.2.3 Vehicle Accident Category Scale (Maycock, Lockwood, & Lester, 1991, cited in West & Hall, 1997; French et al., 1993)

Number of accidents were reported by asking drivers to indicate how many accidents they had been involved in over the last three years. The format of the question was identical to that used in previous national surveys (Maycock et al., 1991; cited in West & Hall, 1997, and French et al., 1993). But in this study, drivers with fewer than three

years with a full licence were excluded from analyses relating to accident rates to ensure a uniform period for the accident histories.

3.2.2.4 Vehicle Accident Type Scale (West & Hall, 1997)

West and Hall (1997) included this scale after previous research by West classified drivers' self reported accidents into seven different types. These were; a) active shunt, b) active right of way violation, c) active reversing, d) loss of control, e) passive shunt, f) passive right of way and g) passive reversing. An example of an active accident is "I hit another vehicle from behind" and a passive accident "I was hit by another vehicle from behind". Trainees indicated at the end of each type of accident that which best represented any accident they were involved in. West and Hall (1997) found that there was a link between types of accidents, and drivers' attitudes to driving violations.

3.2.2.5 Measures of Accident and Injury Severity (Manna, 1997)

A scale was developed by the researcher specifically to identify the degree of injury to people involved in accidents, and the degree of damage to vehicles involved in accidents.

There were four different sub-scales included in the severity scale. The first sub-scale related to vehicle damage, with seven classifications. These were; no damage, minor dent, some panel damage, 50% damaged, 75% damaged, no longer able to be driven, to 'written off'. The second sub-scale related to the degree of injury of people involved in the accident, with four classifications. These were; at least one person suffered minor bruising (able to be treated at the scene), at least one person injured, at least one person was hospitalized, and a fatality. The third sub-scale involved the vehicle(s) involved and also used four classifications. These were; only the vehicle I was in was involved,

there was a building or structure involved, there was at least one other vehicle involved, and there was more than one other vehicle involved. The final sub-scale consisted of the number of people injured on a four-point scale. These were; a) no one injured, b) one person injured, c) two people injured, and d) more than two people injured (The scale is included in Q.1A, in Appendix D).

Trainees were instructed to indicate at the end of each statement how many times over the last three years they had been in accidents that were the same as those represented in each statement.

3.2.2.6 4WD Ability Scale (Manna, 1997)

The 4WD ability scale consists of 13 situations that people could find themselves in while driving a 4WD vehicle. Each item was to be commented on by indicating at the end of each situation using self-report how well each trainee believed they handle those situations using a 5-point Likert type scale.

3.2.2.7 Skills and/or Abilities Trainees Expect to Learn and/or Gain From the Training Course

Q.1A included a section which required trainees to list down those skills and/or abilities they expected to learn and/or gain form undertaking the course. The common skills/abilities listed by all three trainee groups were used in Q.1B

Q.1B consisted of three versions, and was the second questionnaire distributed to trainees. Q.1B (version A) for Group 1 consisted of twelve skills and/or abilities that trainees from course 1 had indicated that they each expected to learn and/or gain from the course in Q.1A. Q.1B (version B) for Group 2 also consisted of twelve skills and/or

abilities. However, Q.1B (version B) was formed form those skills and/or abilities that trainees from course 2 had indicated on Q.1A that they expected to learn and/or gain from the course. Version A and B of Q.1B had 10 skills and/or abilities in common. Each version (A and B) had an additional two skills and/or abilities unique to their group. Q.1B (version C) for Group 3 had fourteen skills and/or abilities listed. Version C consisted of the 10 common skills and/or abilities from version A and B. Version C also included the two skills and/or abilities that were unique to version A and the two skills and/or abilities that were unique to version B. Trainees were instructed to indicate 'how useful' it would be to learn the skill/ability on a 5 point Likert type scale, ranging from *'very useful'*, to *'not at all useful'*. They also had to indicate 'how much they knew' at that time about each skill/ability, again using a 5 point Likert type scale, from *'everything'*, to *'nothing at all'* (Copies of all three versions of Questionnaire 1-B are included in Appendix D).

3.2.3 *Procedure*

The researcher, in consultation with her Supervisor, designed the study of which such protocol was reviewed and approved by the Massey University Human Ethics Committee. The researcher then contacted The Company to collect information about the available Level 2 4WD driving courses that were to be run in locations accessible to the researcher between October 1 and December 18, 1997. The Company provided the researcher with information on how many people from different employers would be going through the courses. Prospective trainees' employers were approached on behalf of the researcher by The Company to ask permission for the trainees to be to be invited to participate in the study. There were six stages that all trainees' in their respective groups went through in providing data. In Figures 1, 2 and 3, the data collection sequence can be seen for each group. In Stage 1, once permission was granted to The

Company for prospective trainees' to be contacted for participation in the study, details of the research were explained and an information sheet was circulated to each prospective trainee.

There were three different groups of trainees, one group from each of the three courses. In Stage 2, trainees' in each group were sent an information sheet (see Appendix A) attached to Q.1A, which included a consent form, and a post paid reply envelope. These were distributed two weeks before the commencement date of each groups' course. Prospective trainees were instructed to return the questionnaires before their course commencement date. Reminder letters for the return of Q.1A were sent out three days before the course commencement date. In Stage 3, after completed trainees' returned completed Q.1A's in the post-paid reply envelopes, the researcher coded the consent forms so that no one person could be identified from the reading of any final report (A copy of the consent form is in Appendix B).

In Stage 4, each group completed their version of Q.1B on the morning of their training course, immediately before the course started in a time constrained to 15 minutes. These were then collected by the researcher for groups 1 and 2, and by the course instructor for group 3.

Between the 7th and 14th of July of 1998, Stage 5 was undertaken. Q.2 along with a post-paid reply envelope was sent to all trainees that had been in each of the three groups, which participated in this study. In Stage 6, trainees' returned completed Q.2's in the post-paid reply envelopes provided.

The stages that each group of trainees (Groups 1,2 and 3) went through are illustrated in Figures 1, 2 and 3 respectively.

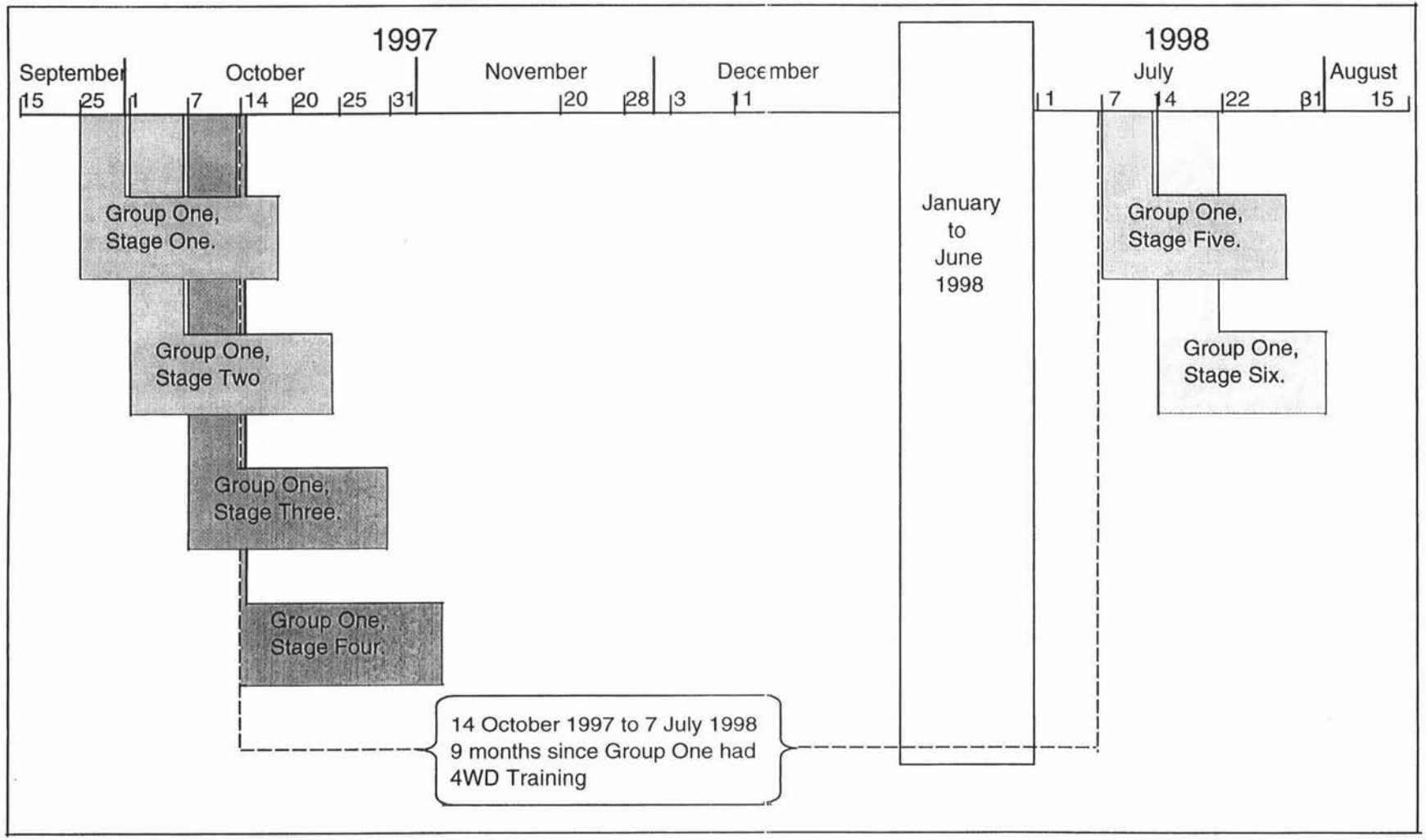

Figure 1. Data gathering timetable for Group One

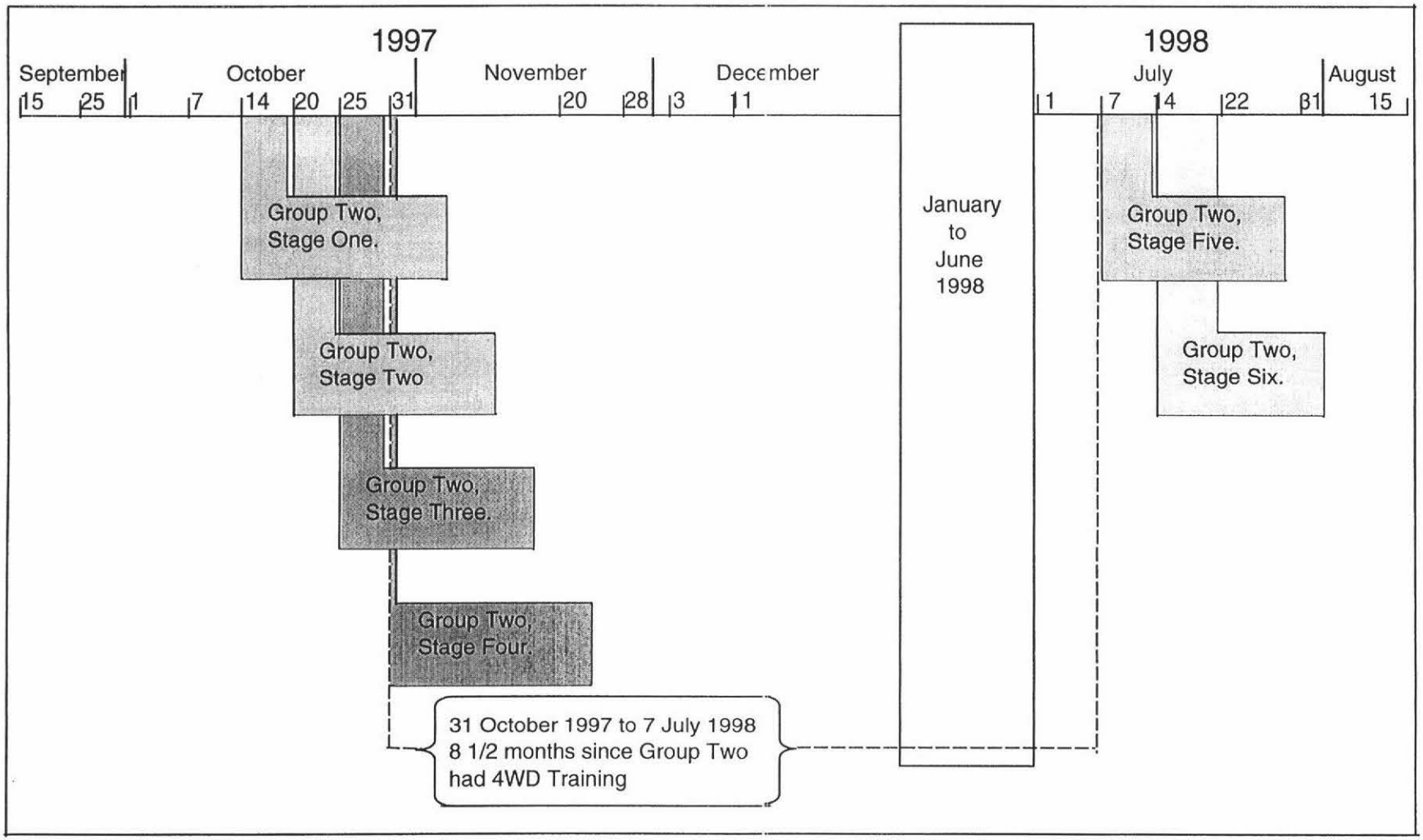

Figure 2. Data gathering timetable for Group Two

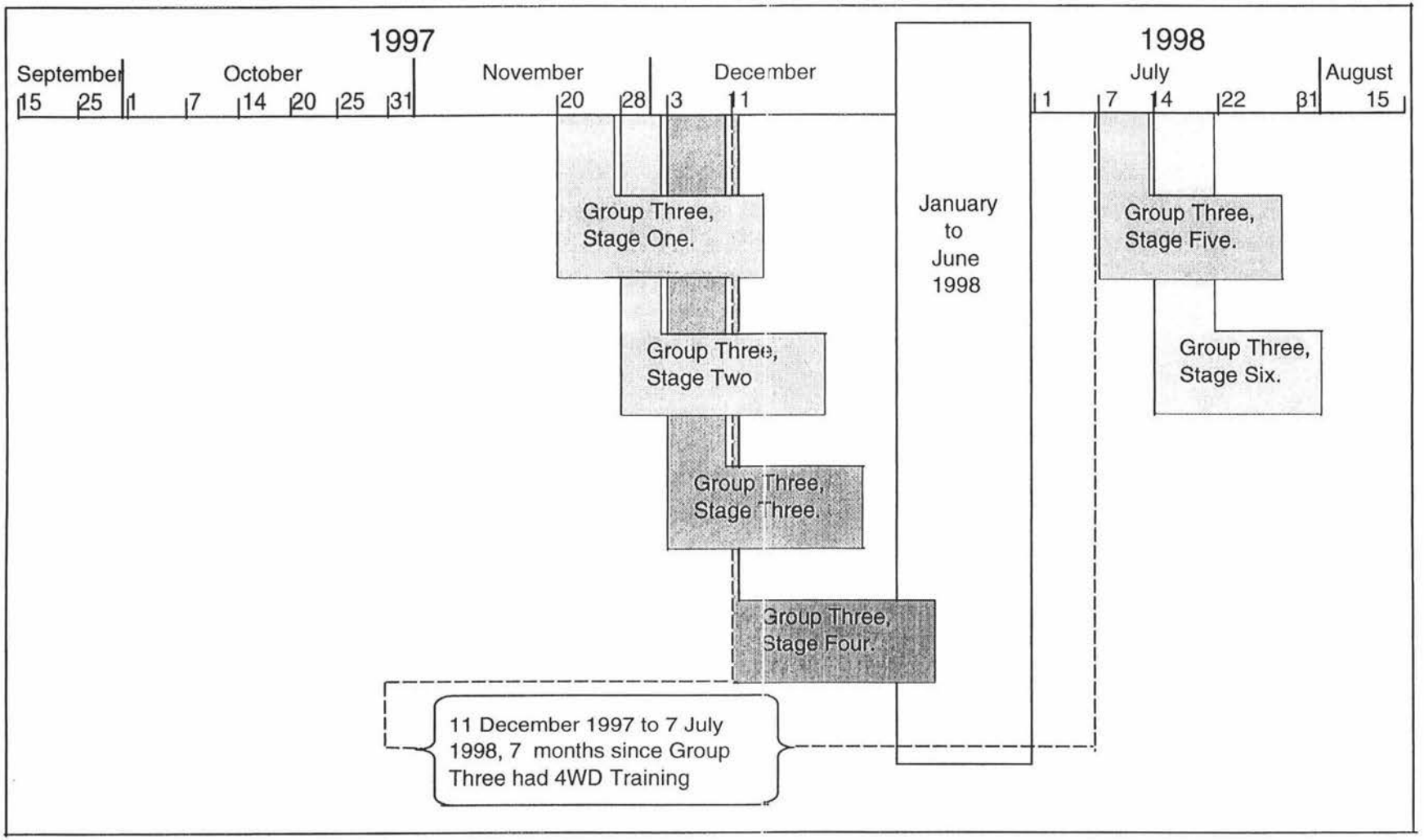

Figure 3. Data gathering timetable for Group Three

4. RESULTS

Of the 36 trainees who completed the training course, 14 trainees returned Q.1A, with three trainees submitting incomplete Q.1A's. There were eleven males and three females in the sample. Q.1A contained demographic information about the trainees, including their gender, marriage status, number of children, ethnicity, educational and training backgrounds, present occupational status and driver licence records. Further driving information was gathered concerning trainees' 4WD experience and driving ability, any vehicle accidents involved in, including type of accident and damage to people and vehicles. Additional information was gathered on trainees' personal characteristics using the Attitudes to Driving Violations Scale (ADVS) and the Safety Locus of Control (SLOC) scale. The last section of Q.1A asked trainees about the reasons for attending the course and what skills and/or abilities they expected to gain from the course.

Thirty-seven trainees completed Q.1B immediately prior to the commencement of the training course, with one Q.1B incomplete. Q.1B was comprised of those skills and/or abilities trainees had indicated they expected to learn about in Q.1A. Trainees indicated how important it was to learn about each of the skills and/or abilities listed, and how much they knew, at that time (pre-training), about each of the skills and/or abilities listed. A total of 17 trainees returned Q.2, seven months after the last training course in December. Of those seventeen Q.2s that were returned, 11 were matched with returned Q.1A's. Some Q.2s were incomplete. Q.2 was comprised of some of the pre-training measures (notably the SLOC and ADVS scales), including asking about each trainee's knowledge on a selection of skills and/or abilities after the training.

4.1 Person Analysis

4.1.1 *Research Question One*

Of those respondents, who completed Q.1A, over three quarters were male (79%). In Table 1, it can be seen that the males were from a broader age range, 20 through to 59 years of age, with a similar number of males in each age group compared to all the females who were in the 20-29 age group. A similar proportion of males and females were currently married or de facto married (approximately two thirds). None of the females had children, whereas almost two thirds of the males had two or more children (63%). The majority of both males (54%) and females (67%) identified with being of New Zealand European ethnicity, with two males (18%) identifying as New Zealand Mäori. Two males and one female identified as 'other'.

Table 1

Trainees Personal Demographic Information (n=14)

Demographic Variables	Male (n=11) n	(%)	Female (n=3) n	(%)
Age (years)				
20-29	3	27.28	3	100.00
30-39	2	18.18	-	-
40-49	2	18.18	-	-
50-59	2	18.18	-	-
Missing data	2	18.18	-	-
Marital status				
Single	3	27.27	1	33.33
Married / De facto	7	63.64	2	66.67
Divorced	1	9.09	-	-
Children				
No children	4	36.36	3	100.00
2 children	3	27.28	-	-
3 or more children	4	36.36	-	-
Ethnicity				
New Zealand Mäori	2	18.18	-	-
New Zealand European	6	54.55	2	66.67
Other	2	18.18	1	33.33
Missing data	1	9.09	-	-

As shown in Table 2, more males had completed 6th form (45%) than 5th form (27%) or 7th form (27%). In comparison, the ratio of females completing 7th form (67%) to 6th form (33%) was 2:1. Males had attended a variety of institutions for further education,

with almost half (45%) having attended Polytechnic, nearly two thirds (63%) having attended University and one person having attended each of three other educational institutions. However, all three females had attended University, with one female also having attended an 'other' educational institution.

Table 2

Trainees Education and Training Backgrounds (n=14)

Education Variables	Male (n=11) n	(%)	Female (n=3) n	(%)
Education				
Completed 5th form	3	27.27	-	-
Completed 6th form	5	45.46	1	33.33
Completed 7th form	3	27.27	2	66.67
Further education ❶				
Polytechnic	5	45.46	-	-
University	7	63.63	3	100.00
NZ Employment course	1	9.09	-	-
Teachers training College	1	9.09	-	-
Other Institution	1	9.09	1	33.33

❶ Some trainees indicated more than one area where they had undertaken further training

Table 3

Trainees Employment Information (n=14)

Occupation Variables	Male (n=11) n	(%)	Female (n=3) n	(%)
Occupation				
Wgtn City Council	3	27.27	2	66.67
Wgtn Regional Council	3	27.27	-	-
Conservation Department	1	9.09	1	33.33
Maritime Safety Authority	2	18.19	-	-
Fish & Game Council	1	9.09	-	-
Other, not stated	1	9.09	-	-
Time employed (yrs. mnths)				
Less than five years	8	72.73	3	100.00
10 –14.11 years	2	18.18	-	-
15 – 19.11 years	1	9.09	-	-

Trainees were employed in a range of occupational areas (Table 3), with over half (54%) of the males being employed by either the Wellington City or Regional

Councils. The remaining 5 males were employed in a variety of areas. Two females were employed with the Wellington City Council, with one female being employed by the Department of Conservation. All females and almost three-quarters of the males (72%) had been in their current employment for less than five years. Two males had been employed for more than 10, but less than 15 years, and only one male had been employed for more than 15 years.

All females and over three-quarters (81%) of the males in Table 4 held at least one licence. One female held three or more licences, while almost half the males (44%) held more than one licence, while half of the latter (22%) held more than three licences.

Table 4

Trainees Vehicle Licence Information (n=14)

	Male (n=11)		Female (n=3)	
Licence Variables	n	(%)	n	(%)
Drivers Licence Held				
Yes	9	81.82	3	100.00
No	2	18.18	-	-
Number of licences held ❶				
One	5	55.56	2	66.67
Two	2	22.22	-	-
Three or more	2	22.22	1	33.33

❶ n=9

4.1.2 *Research Question Two*

Table 5

Trainees 4WD Experience (n=14)

	Male (n=11)		Female (n=3)	
4WD Variables	n	%	n	%
Any 4WD training				
Yes	5	45.45	1	33.33
No	6	54.55	2	66.67
Type of Training ❶				
Professional	2	40.00	-	-
Informal	2	40.00	1	100.00
Mixture	2	40.00	-	-

❶ n=5, one male indicated more than one type of training

Almost half of the males (45%) and one third of the females had had previous 4WD training (Table 5). Equal numbers of males had had professional, informal or a mixture of both types of training, whereas the female had had only informal training.

4.1.3 *Research Question Three*

In Table 6, before training, Group One believed they could not handle a 4WD vehicle well at all, less so than Group Three. However, Group One believed they were more able to handle a 4WD vehicle before training than were Group Two.

Table 6

Trainees Pre-training Belief in Their Handling of a 4WD Vehicle (n=11)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	3		
2	3	M = 2.75	
3	2	SD = 0.50	
4	3		
Group Two			
5	2		N = 11
7	2	M = 2.25	Mean = 2.64
8	2	SD = 0.50	Standard Deviation = 0.67
9	3		Median = 3.00
			Range = 2.00 to 4.00
Group Three			
11	4	M = 3.00	
12	3	SD = 1.00	
13	2		

Scale '1= not well at all', to "5=very well'

In Table 7 it can still be seen that Group Two believed they were marginally less able to handle a 4WD vehicle after training than either of Groups One and Three. Also, Group Three still believed they were marginally more able to handle a 4WD vehicle after training. The range for scores after training was half of that indicated before training.

Table 7

Trainees Post-training Belief in Their Handling of a 4WD Vehicle (n=11)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	4		
2	3	M = 3.50	
3	3	SD = 0.58	
4	4		
Group Two			
5	3		N = 11
7	3	M = 3.25	Mean = 3.45
8	4	SD = 0.50	Standard Deviation = 0.52
9	3		Median = 3.00
			Range = 3.00 to 4.00
Group Three			
11	4	M = 3.67	
12	4	SD = 0.58	
13	3		

Scale '1 = not well at all', to '5 = very well'

A t-test was found to be significant for trainees pre- and post-training belief in their handling of a 4WD vehicle $t(12) = 4.5$, $p<0.01$).

4.1.4 *Research Question Four*

As can be seen in Table 8, in the Driving Ability scale, the higher the trainee's score, the better trainees believe their ability is with a 4WD vehicle in certain situations.

Responses were on a 5 point continuum, from '1- Not well at all' through to '3 - OK', to '5- Very well". All three groups (pre-training) scored just below the mean ('3 - OK') on the scale.

Group One had a smaller standard deviation compared to both Groups Two and Three, although Group Two had a slightly smaller standard deviation than group three.

Table 8

Trainees Pre-training 4WD Driving Ability (n=10)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	2.9		
2	3.0	*M* = 2.80	
4	2.5	*SD* = 0.26	
Group Two			
5	1.9		*N*=10.00
7	1.8	*M* = 2.48	Mean = 2.66
8	3.2	*SD* = 0.73	Standard Deviation = 0.66
9	3.0		Median = 2.80
			Range = 1.80 to 3.80
Group Three			
11	3.8	*M* = 2.77	
12	2.7	*SD* = 1.00	
13	1.8		

Scale: '1=not too well', to '5=very well'.

Table 9

Trainees Post-training 4WD Driving Ability (n=10)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	4.5		
2	3.1	*M*= 3.60	
4	3.2	*SD* = 0.78	
Group Two			
5	2.7		*N*=11.00
7	2.7	*M* = 3.03	Mean = 3.32
8	3.3	*SD* = 0.38	Standard Deviation = 0.59
9	3.4		Median = 3.15
			Range = 2.7 to 4.5
Group Three			
11	4.2		
12	3.0	*M* = 3.43	
13	3.1	*SD* = 0.67	

Scale: '1=not too well', to '5=very well'.

In Table 9, trainees post-training 4WD ability had all three groups scoring above the scale mean ('3 – OK') on the ability scale. Group One scored over half a point more above this scale mean. Groups Two and Three had standard deviations that were 0.35 and 0.33 below their pre-training standard deviations with higher group means. However Group One had a much larger standard deviation after training, by 0.52.

A t-test on trainees' pre- and post-training 4WD driving ability was significant $t(9) = 4.2, p< 0.01$).

As can be seen in Table 10, only item 1 on the Driving Ability scale was indicated as being an area of driving in relation to 4WD vehicles that trainees considered themselves to be better than 'OK' at. All other items on the scale were in the 'not too well' to 'OK' category for pre-test driving ability. Item 6, reversing down a wet hill received the lowest competence rating, but at the same time it had the biggest variance (SD = 1.09). Of all items involving the skill of driving forward, the least value of 2.60 was 0.40 higher than the least value for reversing items (2.20), indicating that trainees had more ability to drive vehicles forward than backwards.

Table 10

Pre-training 4WD Driving Ability Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
1	Driving forward through uneven dry ground	3.30	0.48
2	Driving forward through uneven boggy ground	2.80	0.79
3	Reversing through uneven dry ground	2.80	0.79
4	Reversing through uneven boggy ground	2.50	0.85
5	Driving froward down a hill	2.80	0.92
6	Reversing down a wet hill	2.20	1.09
7	Driving forward up a wet hill	2.80	0.79
8	Driving forward around a slope on a wet hill	2.60	0.73
9	Reversing around a slope on a wet hill	2.30	1.00
10	Driving forward up a wet hill and stopping mid way up	2.60	0.88
11	Driving forward through a ford	2.80	0.67
12	Reversing back through a ford	2.60	1.01
13	Other conditions (snow, ice, sand)	2.70	0.71

Scale: '1=not well at all' to '5=very well'

Trainees post-training scores on the driving ability scale in Table 11 have indicated that their ability on all items referring to 4WD vehicle driving increased by between 0.40 and 1.08 scale points. Scores indicated that item 11 was the one item where trainees ability increased the most, with item 4 being the least improved area of trainees ability.

Table 11

Post-training 4WD Driving Ability Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
1	Driving forward through uneven dry ground	4.10	0.74
2	Driving forward through uneven boggy ground	3.50	0.71
3	Reversing through uneven dry ground	3.40	0.70
4	Reversing through uneven boggy ground	2.90	0.74
5	Driving froward down a hill	3.30	0.67
6	Reversing down a wet hill	2.90	0.74
7	Driving forward up a wet hill	3.30	0.82
8	Driving forward around a slope on a wet hill	3.10	0.57
9	Reversing around a slope on a wet hill	2.90	0.74
10	Driving forward up a wet hill and stopping mid way up	3.20	0.92
11	Driving forward through a ford	3.88	0.83
12	Reversing back through a ford	3.38	0.52
13	Other conditions (snow, ice, sand)	3.38	0.52

Scale: '1=not well at all' to '5=very well'

Pre- and post-training item means on the 4WD driving ability scale were significant in a t-test $t(9) = 13.4$, $p < 0.01$.

4.1.5 *Research Question Five*

Safety Locus of Control (SLOC) scale

The SLOC scale was administered at pre-training to determine a baseline Safety Locus of Control score for trainees before undertaking training. Such information was sought to determine if there was any evidence of a link between safety scores and other measures used in this study, and it could be compared with post-test safety scores of trainees after training, sometime in the future.

The method of scoring is similar to that used by Jones (1985) who initially developed the scale, and a direct replication of Wuebker (1986). A six-point Likert-type scale,

ranging from "Agree Very Much" to "Disagree Very Much," was used for all 17 items in the scale. The median scores are calculated for all items over the 13 trainees. Weightings of –1 were assigned if their score was below the median split on an item, 0 if their scores were the same as the median split for that item, or +1 if their score was above the median for that item. Trainees' scores could range from –17 to +17. The higher the score, the more internal a trainee's locus of control.

In Table 12 it can be seen that Group One had the highest positive mean score, indicating that the trainees who made up this group were more internal in their safety orientation than the other two groups. Group Two also had a positive mean score, lower then Group One, but higher than Group Three. The mean score for Group Three ($M = -4.33$) indicated this group as a whole had an external safety locus of control.

Table 12

Trainees Pre-training Safety Locus of Control Scale scores (n=10)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	– 7		
2	+ 0		
3	+ 6	M = + 1.50	
4	+ 7	SD = + 6.45	
Group Two			N = 10
			Mean = – 0.40
5	+ 3		Standard Deviation = 5.82
7	+ 3	M = + 1.00	Median = + 1.50
9	– 3	SD = + 3.46	Range = – 10.00 to + 7.00
Group Three			
11	+ 3		
12	– 6	M = – 4.33	
13	– 10	SD = + 6.66	

Scale range: -17 to +17

The scores in Table 13 indicate that after training, trainees in Group Two were now externally oriented and the trainees in Group Three were now internally oriented. Trainees in Group One were still internally oriented. There was no significant result

found for a t-test $t(9) = 1.8$.

Table 13

Trainees Post-training Safety Locus of Control Scale scores (n=10)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	+ 0		
2	– 1	$M = 0.25$	
3	– 1	$SD = 1.89$	
4	+ 3		
Group Two			
			$N = 10$
5	– 2	$M = -4.00$	Mean = – 0.70
7	– 4	$SD = 2.00$	Standard Deviation = 3.77
9	– 6		Median = – 1.00
			Range = – 6.00 to + 5.00
Group Three			
11	+ 5	$M = 1.33$	
12	+ 4	$SD = 5.51$	
13	– 5		

Scale range: -17 to +17

Table 14 shows the pre-training item means and standard deviations for all internal SLOC scale items. Using the same 6-point scale, lower values (1-3) indicate agreement with the items, and higher values (4-6) disagreement. Agreement with these items indicates an internal safety locus of control. The results indicate that trainees were in agreement with all items, items 1 and 15 showing the strongest agreement. The two items with a mean of 3.20 have the highest variances, item 7 with a standard deviation of 1.40, and item 12 with a standard deviation of 1.03. These standard deviations indicate trainees' responses varied more on these two items in comparison to the other internal items, e.g. items 1 and 15 have standard deviations of 0.57, indicating that trainees responses were not as varied on this item.

A t-test of pre- and post-training internal SLOC scale item means was significant $t(9) = 7.7, p < 0.01$).

Table 14

Safety Locus of Control Scale: Pre-training Internal Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
1	If employees follow rules, they avoid many accidents	1.90	0.57
3	Occupational accidents occur as employees are unsafe	2.90	0.74
7	Most industrial accidents due to employee carelessness	3.20	1.40
9	Most accidents resulting in injuries are preventable	2.10	0.57
12	Employees' accidents result from the mistakes they make	3.20	1.03
15	People avoid injury if they are careful & aware of dangers	1.90	0.57
16	Is a connection between careful employees and accidents	2.20	0.79

Scale: '1=agree very much' to '6=disagree very much'

Post-training internal item means for trainees in Table 15, indicated the same items were viewed as being in agreement or disagreement with. Items 7 and 12 were both disagreed with (greater than or equal to 3.50) after training. The other five internal items were still agreed with, but less so than before training with all items values increasing between 0.30 and 0.60 scale points.

Table 15

Safety Locus of Control Scale: Post-training Internal Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
1	If employees follow rules, they avoid many accidents	2.50	0.97
3	Occupational accidents occur as employees are unsafe	3.20	1.14
7	Most industrial accidents due to employee carelessness	4.10	0.74
9	Most accidents resulting in injuries are preventable	2.50	0.71
12	Employees' accidents result from the mistakes they make	3.80	0.63
15	People avoid injury if they are careful & aware of dangers	2.50	0.71
16	Is a connection between careful employees and accidents	2.70	1.06

Scale: '1=agree very much' to '6=disagree very much'

Table 16 illustrates the item means and standard deviations for all pre-training external SLOC scale items. Again, lower values (1-3) indicate agreement with the items, and higher values (4-6) disagreement. However, agreeing with these items indicates an external safety locus of control. A score of 3.50 indicates neither agreement, or disagreement. In Table 16, items 8 and 10 were the only external items trainees agreed

with to some extent. Out of all the other external items, trainees disagreed with items 4, 5, 11 and 14 the most. Item 17 had a value equal to the mid-point of 3.50, indicating no clear-cut direction of trainees. Close to this mid-point was item 2, indicating item 2 not being a strong measurement of external safety locus of control.

Table 16

Safety Locus of Control Scale: Pre-training External Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
2	Industrial accidents result of unsafe equipment regulations	3.60	1.26
4	Avoiding accidents is a matter of luck	4.50	1.08
5	Most accidents and injuries at work cannot be avoided	4.20	1.40
6	Is the company's responsibility to prevent work accidents	3.80	1.32
8	You never know how or when you might be in an accident	2.60	0.70
10	There will always be on-the-job accidents	2.20	0.92
11	Whether people get injured is a matter of fate	4.30	1.16
13	Most on-the-job accidents can be blamed on management	3.90	1.29
14	Most injuries caused by accidents outside people's control	4.40	0.70
17	Most accidents are unavoidable	3.50	1.96

Scale: '1=agree very much' to '6=disagree very much'

Table 17

Safety Locus of Control Scale: Post-training External Item Means and Standard Deviations (n=10)

Item		*M*	*SD*
2	Industrial accidents result of unsafe equipment regulations	3.90	0.88
4	Avoiding accidents is a matter of luck	5.30	0.67
5	Most accidents and injuries at work cannot be avoided	5.00	0.82
6	Is the company's responsibility to prevent work accidents	4.50	1.51
8	You never know how or when you might be in an accident	3.10	1.10
10	There will always be on-the-job accidents	2.60	1.07
11	Whether people get injured is a matter of fate	4.80	0.92
13	Most on-the-job accidents can be blamed on management	4.20	0.42
14	Most injuries caused by accidents outside people's control	4.00	0.47
17	Most accidents are unavoidable	4.80	0.79

Scale: '1=agree very much' to '6=disagree very much'

In Table 17, trainees post-training external scale scores indicate that they only disagreed with item 10. All other items, except item 14 were agreed with more post-training, than pre-training. A t-test between pre- and post-training external item means was significant $t(9) = 3.7$, $p < 0.01$.

4.1.6 *Research Question Six*

Attitudes to Driving Violations Scale (ADVS)

The ADVS was administered at pre-training to determine trainees' baseline Attitude to Driving Violation scores. Such information was sought to determine if there was any evidence of a link between driving violation scores and other measures used in this study, and scores could be compared with post-test driving violation scores of trainees after training.

The method of scoring was similar to that used by West and Hall (1997). A five-point Likert-type scale, ranging from "1=Strongly Agree" to "5=Strongly Disagree" was used for all seven items in the scale. Scores for each trainee were then the total of each items' score in the scale. West and Hall put scores in one of three bands depending on their total value. Scores under 15 indicated general agreement, scores 15 to 21 indicated a neutral stance, and scores above 21 indicated disagreement with the statements. The range of scores could fall between 7 and 35. Trainees pre- and post-training scores (pooled over the three groups), on the ADVS were not found to be significant in a t-test $t(9) = 0.1$.

In comparison with West and Hall (1997), the scores for this sample (Table 18) on the ADVS were a little higher. West and Hall had a mean of 18.53 (SD = 5.03, N = 406). Group Three were the most in agreement with the statements (M = 18.00), but this value would only put them into the neutral band using West and Hall's criteria for agreement. Groups One (M = 22.50) and Two (M = 22.75) indicate general disagreement with the statements. The overall mean (21.36) falls just outside the neutral stance and into the disagreement band of West and Hall's criteria. Only one trainee's score (13) indicated general agreement with the statements.

Table 18

Trainees Pre-training Attitudes to Driving Violations Scale scores (n=11)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	23		
2	24	M = 22.50	
3	22	SD = 1.29	
4	21		
Group Two			
			N = 11
5	21		Mean = 21.36
7	21	M = 22.75	Standard Deviation = 3.26
8	24	SD = 2.06	Median = 22.00
9	25		Range = 13 to 25
Group Three			
11	22		
12	19	M = 18.00	
13	13	SD = 4.58	

Scale range: 7 to 35

Table 19

Trainees Post-training Attitudes to Driving Violations Scale scores (n = 11)

Trainee	Score	Group Means and Standard Deviations	Overall Statistics
Group One			
1	18		
2	25	M =22.50	
3	24	SD = 3.11	
4	23		
Group Two			
			N = 11
5	22		Mean = 21.18
7	13	M = 19.75	Standard Deviation = 3.63
8	24	SD = 4.79	Median = 22.00
9	20		Range = 13.00 to 25.00
Group Three			
11	24	M = 21.33	
12	22	SD = 3.06	
13	18		

Scale range: 7 to 35

Post-training ADVS scores in Table 19 show that Group One has the same mean as pre-training (22.50) but has greater variance in scores than before (SD = 3.11). Group Two has a lower mean and Group Three has a higher mean after training. Each of the three trainees in Group Three obtained higher scores after training, whereas Group Two had scores equal to or below their pre-training scores. In the ADVS, each item value could range from '5=strongly disagree to '1=strongly agree'.

In Table 20, item 1 had the highest mean score, representing a negative attitude to decreasing speed limit on the motorway, whereas items 2 and 4 had the lowest mean scores. This suggests trainees believe that keeping within the speed limit at night-time on quiet roads and driving slower than the speed limit when it is raining are both positive ideas.

Table 20

Attitude to Driving Violations Scale: Pre-training Item Means and Standard Deviations (n=11)

Item	Statement	*M*	*SD*
1	Decreasing speed limit on the motorway is a good idea	4.27	0.65
2	At night-time, it is important to keep within speed limits	2.09	0.83
3	Drivers who cause accidents should be banned for life	2.82	0.98
4	People should drive less than the speed limit when raining	2.09	0.54
5	Cars should never overtake on the inside lane	2.91	1.14
6	Where there are lots of pedestrians, it should be 30 km/hr	3.82	1.17
7	Penalties for speeding should be more severe	3.36	1.12

Scale: '1-strongly agree' to '5-strongly disagree'

A t-test between pre- and post-training item means on the ADVS was not significant $t(9) = 0.2$.

Post-training item means and standard deviations in Table 21 indicate that items 1 and 3 were the only two items trainees disagreed with more than before training. All other items except items 2 and 4 were more agreed with after, than before training.

Table 21

Attitude to Driving Violations Scale: Post-training Item Means and Standard Deviations (n = 11)

Item	Statement	*M*	*SD*
1	Decreasing speed limit on the motorway is a good idea	4.36	0.67
2	At night-time, it is important to keep within speed limits	2.09	0.94
3	Drivers who cause accidents should be banned for life	3.55	0.82
4	People should drive less than the speed limit when raining	2.09	0.83
5	Cars should never overtake on the inside lane	2.73	1.27
6	Where there are lots of pedestrians, it should be 30 km/hr	3.36	0.92
7	Penalties for speeding should be more severe	2.91	1.30

Scale: '1-strongly agree' to '5-strongly disagree'

4.1.7 *Research Question Seven*

Just over a quarter of the males (27%) indicated they had been in an accident (Table 22). These were trainees 2, 9 and 10. Of these three males, two had been involved in one accident, while the remaining male had been involved in two accidents.

Table 22

Trainees Accident Information (n=14)

	Male (n=11)		Female (n=3)	
Accident Variables	*n*	(%)	*n*	(%)
Have you had an accident				
Yes	3	27.27	-	-
No	8	72.73	3	100.00
How many?				
1	2	66.67	-	-
2 or more	1	33.33	-	-
Type of accident				
Active shunt	2	66.67	-	-
Missing data	1	33.33	-	-
Vehicle damage				
There was no damage	1	33.33	-	-
Vehicle had a minor dent	1	33.33	-	-
There was panel damage	1	33.33	-	-
Vehicles involved				
Building/structure as well	1	33.33	-	-
At least one other vehicle	2	66.67	-	-
Number injured				
There was no one injured	3	100.00	-	-

Only two males indicated what type of accident they had been involved in, an active shunt. Each male had incurred a different type of vehicle damage. All accidents had involved either another vehicle or a building/structure. None of the accidents had resulted in personal injury.

4.2 Organisational Analysis

4.2.1 *Research Question Eight*

Over half of the males (55%) and none of the females indicated attendance was an official requirement of their employment contract in Table 23. One each of the males and females were told by an authority figure to attend the training. Over half of the males, and two thirds of the females were at the training because they choose to attend.

Table 23

Trainees Reasons for Attending the Course (n=14)

	Male (n=11)		Female (n=3)	
Reasons	n ❶	(%)	n	(%)
Told to attend	1	9.09	1	33.33
Employment requirement	6	54.55	-	-
Choose to attend	6	54.55	2	66.67

❶ One male indicated all three reasons for attending the course

4.2.2 *Research Question Nine*

In Table 24, over half (55%) of the males felt they definitely needed the course. Over a quarter (27%) of the males and two thirds of the females felt they probably needed the course. The remaining female and two males felt they maybe needed the course.

Table 24

Trainees Belief in How Strongly They Needed the Course (n=14)

	Male (n=11)		Female (n=3)	
Need Variables	n	(%)	n	(%)
Definitely need the course	6	54.55	-	-
Probably need the course	3	27.27	2	66.67
Maybe need the course	2	18.18	1	33.33

4.3 Task Analysis

4.3.1 *Research Question Ten*

The last section of Q.1A required trainees to list down those skills and/or abilities they expected to learn and/or gain from undertaking the course. Q.1B consisted of three versions, one for each group made up of their own responses on Q.1A. From those skills and/or abilities that trainees listed, the researcher interpreted and grouped like skills and/or abilities together producing 12 items listed for Group One, 12 items for Group Two, and 14 items for Group Three. There were ten skills and/or abilities in common across all three groups. The original responses made by each group on Q.1A are in Appendix E. Q.2 was made up of only those ten skills and/or abilities that were common across all groups and was completed at least seven months after training to give a measure on which to compare pre-training knowledge scores.

The ten skills and/or abilities were:

1. After learning the appropriate skills, to also be aware of their own abilities as a driver of a 4WD vehicle
2. To have the confidence to be able to handle a 4WD vehicle in most conditions that they would encounter
3. To be aware of the potential dangers and risks associated with 4WD driving
4. To know correct gear selection of 4WD's and also to learn about engine braking
5. To be aware of the limitations and/or capabilities of individual 4WD vehciles
6. To improve their reversing skills and use of mirrors when their visibility is limited
7. To learn safe river crossing techniques and to know how to test for water levels
8. To learn about safety, learn how to be a competent driver in control of a 4WD vehicle
9. Learn how to handle a 4WD vehicle on steep gradients in both wet and dry conditions
10. To learn about the technical make-up and to have a mechanical appreciation of how a 4WD vehicle works

Each group of trainees was asked to indicate 'how useful' it would be learn each skill and/or ability listed in Q.1B on a 5 point Likert type scale, ranging from '1=very useful' to '5=not at all useful'. They also indicated 'how much they knew' at that time about each skill and/or ability, again using a 5 point Likert type scale, form

'1=everything', to '5=nothing at all'. (Item means and standard deviations for all three groups for how useful it would have been to learn each skill and/or ability, and how much they knew about each skill and/or ability at that time are in Appendix G and H).

4.3.2 *Research Question Eleven*

In Table 25, only those ten skills and/or abilities common across all groups are tabled. Lower scores indicated items that would be very useful to learn and/or gain, e.g. items 1, 2, 3, 4, 8 and 9. The slightly higher scores of items 5, 6, 7 and 10, indicate that trainees' thought they would only be 'useful sometimes'.

Table 25

Usefulness of Skill and/or Ability: Item Means and Standard Deviations Across All Trainees (n=37)

Item	Ability and/or Skill	*M*	*SD*
1	After learning skills be aware of own abilities as a driver	1.19	0.46
2	Have the confidence to handle a 4WD in most conditions	1.35	0.59
3	Be aware of the potential dangers & risks of 4WD driving	1.08	0.28
4	Correct gear selection and knowledge of engine braking	1.32	0.58
5	Be aware of the limitations/capabilities of individual 4WDs	1.62	0.68
6	Improving reversing & mirror use when visibility is limited	1.61	0.55
7	Learn safe river crossing techniques and water levels	1.62	0.72
8	Safety, learn how to be competent & in control of a 4WD	1.14	0.35
9	How to handle steep gradients in both wet & dry conditions	1.14	0.54
10	Learn technical make-up & have a mechanical appreciation of 4WD's	2.16	0.96

Scale: '1-very useful' to '5-not at all useful'

4.3.3 *Research Question Twelve*

In Table 26, higher scores indicate a lessening knowledge about the items, with scores lower than 3 indicating a greater deal of knowledge of each item. None of the means indicate trainees knew 'enough' at that time about any skill and/or ability. All of the items fell in the range of 3.5 to 4.5, indicating on average that trainees at least knew a little bit about each skill and/or ability.

Table 26

Knowledge of Skill and/or Ability: Item Means and Standard Deviations Across All Trainees (n=36)

Item	Ability and/or skill	*M*	*SD*
1	After learning skills be aware of own abilities as a driver	3.51	0.74
2	Have the confidence to handle a 4WD in most conditions	3.92	0.65
3	Be aware of the potential dangers & risks of 4WD driving	3.83	0.65
4	Correct gear selection and knowledge of engine braking	3.75	0.73
5	Be aware of the limitations/capabilities of individual 4WDs	4.28	0.61
6	Improving reversing & mirror use when visibility is limited	3.61	0.73
7	Learn safe river crossing techniques and water levels	4.42	0.69
8	Safety, learn how to be competent & in control of a 4WD	3.78	0.72
9	How to handle steep gradients in both wet & dry conditions	4.17	0.51
10	Learn technical make-up & have a mechanical appreciation of 4WD's	3.86	0.83

Scale: '1-know everything' to '5-know nothing at all'

Using a within-subjects ANOVA, it was found that the knowledge rating for the skills varied, $F(2,33) = 3.54$, $p < 0.05$, and that the groups' overall level of knowledge differed significantly. A post hoc multiple comparison of means revealed that Group One's mean (M=3.61), was significantly lower than the means of either Group Two (M=4.18) or Group Three (M=3.99). However, the group times skill interaction in level of knowledge was not significant, meaning that the skills they know most about and the least known skills are the same in each group. The group times skill interaction was also not significant in trainees ratings of the usefulness of learning and/or gaining each skill and/or ability.

4.3.4 *Research Question Thirteen*

For Table 27, only those trainees who completed the post-training questionnaire (Q.2) had their mean pre-training knowledge scores calculated as a group. There were ten items that were scored on a Likert type scale. Trainees could score between '1 = everything' and '5 = nothing at all'. Mean scores were calculated by dividing each trainee's total item value by ten. Trainee's mean scores ranged between 1 and 5. The

lower the mean score, the more knowledge each trainee or group had about all ten items. Scores of 3.0 indicate that trainee's/groups knew enough about all the items.

Table 27

Trainees Mean Pre-training Knowledge Scores (n = 14)

Trainee	Score	Group Mean and Standard Deviation	Overall Statistics
Group One			
1	3.0		
2	3.4	M = 3.55	
3	3.9	SD = 0.44	
4	3.9		
Group Two			
			N = 14
5	4.2		Mean = 3.84
7	4.5	M = 4.0	Standard Deviation = 0.43
8	3.9	SD = 0.37	Median = 3.05
9	3.5		Range = 2.3 to 3.7
Group Three			
11	4.2		
12	4.4		
15	4.1	M = 3.92	
17	3.9	SD = 0.44	
18	3.4		
19	3.5		

Scale range: 1 to 5

In Table 27, only trainee 1 had a mean score of 3.0, indicating they knew enough about all the items. All other trainees had mean scores between 3.4 and 4.5, indicating that they all knew a little bit about the items. The mean for Group One indicates that they have more knowledge than either Group Two or Three. The overall mean indicates that trainees do not know a lot about each of the items.

In Table 28, trainee's mean post-training knowledge scores are shown. Again, the mean for Group One indicates they are more knowledgeable than either Group Two or Group Three. The mean for Group Three is only just above 3.0, at 3.04, indicating that trainees in this group as a whole almost know enough about each of the items. The

mean of each group has dropped by at least 0.7 scale points, indicating that each group knows more about each item post-training. A t-test on trainees mean pre- and post-training knowledge scores was significant $t\,(13) = 1.93$, $p < 0.05$).

Table 28

Trainees Mean Post-training Knowledge Scores ($n = 14$)

Trainee	Score	Group Mean and Standard Deviation	Overall Statistics
Group One			
1	2.4		
2	3.3	$M = 2.85$	
3	3.2	$SD = 0.47$	
4	2.5		
Group Two			
			$N = 14$
5	3.7		Mean = 2.95
7	3.1	$M = 3.04$	Standard Deviation = 0.41
8	3.0	$SD = 0.42$	Median = 3.9
9	2.8		Range = 3.0 to 4.5
Group Three			
11	2.7		
12	3.2		
15	3.1	$M = 2.94$	
17	2.6	SD =0.44	
18	3.4		
19	2.3		

Scale range : 1 to 5

Table 29

Knowledge of Skill and/or Ability: Pre-training Item Means and Standard Deviations ($n = 14$)

Item	Ability and/or skill	*M*	*SD*
1	After learning skills be aware of own abilities as a driver	3.86	0.66
2	Have the confidence to handle a 4WD in most conditions	3.50	0.76
3	Be aware of the potential dangers & risks of 4WD driving	4.07	0.48
4	Correct gear selection and knowledge of engine braking	3.64	0.63
5	Be aware of the limitations/capabilities of individual 4WDs	4.14	0.77
6	Improving reversing & mirror use when visibility is limited	3.38	0.65
7	Learn safe river crossing techniques and water levels	3.79	0.70
8	Safety, learn how to be competent & in control of a 4WD	3.93	0.62
9	How to handle steep gradients in both wet & dry conditions	3.79	0.59
10	Learn technical make-up & have a mechanical appreciation of 4WD's	4.29	0.61

Scale: '1-know everything' to '5-know nothing at all'

Pre-training means in Table 29 across the knowledge variable of the skills and/or abilities indicate that these trainees did not know very much about each of the items listed. Item 6 was close to the mid-point of 3.00 (3.38) indicating that trainees knew a little bit about reversing using mirrors, with item 10 being the area where trainees had the least knowledge.

Post-training measures indicate that all trainees' knowledge on the items listed in Table 30 increased. Scores for items 5, 7 and 10 were still above 3.00, at 3.43, 3.43, and 3.29. Other item scores indicated that trainees knew between 'quite a lot' and 'enough' about each of them. Items 8 and 9 had the biggest score increases of 1.22 scale points.

Table 30

Knowledge of Skill and/or Ability: Post-training Item Means and Standard Deviations (n = 14)

Item	Ability and/or skill	*M*	*SD*
1	After learning skills be aware of own abilities as a driver	2.93	0.62
2	Have the confidence to handle a 4WD in most conditions	2.79	0.58
3	Be aware of the potential dangers & risks of 4WD driving	2.93	0.47
4	Correct gear selection and knowledge of engine braking	2.64	0.50
5	Be aware of the limitations/capabilities of individual 4WDs	3.43	0.85
6	Improving reversing & mirror use when visibility is limited	2.79	0.43
7	Learn safe river crossing techniques and water levels	3.43	0.65
8	Safety, learn how to be competent & in control of a 4WD	2.71	0.61
9	How to handle steep gradients in both wet & dry conditions	2.57	0.85
10	Learn technical make-up & have a mechanical appreciation of 4WD's	3.29	0.73

Scale: '1-know everything' to '5-know nothing at all'

A t-test on pre- and post-training knowledge items was significant $t(13) = 9.8$, $p < 0.01$.

5. DISCUSSION

There were several aims of this study. One aim was to establish the personal characteristics of a particular sample of trainees who have undertaken a 4WD training course. Such information would be used in future research in this area for comparison of between groups sample compositions. The second aim was to determine what previous experience trainees had with 4WD vehicles, self-report belief of their handling of, and ability in 4WD vehicles before and after training. A further aim was to determine if there was a link between those trainees who had had previous accidents, their SLOC scale scores and their ADVS scale scores. The researcher also wanted to verify if trainees SLOC and ADVS scores were affected by training. In relation to the training, the study also ascertained why trainees attended such a training programme and how much they perceived themselves as needing to attend the programme. A further aim of the study was to establish what skills and/or abilities all trainees expected to learn and/or gain from the training and how useful trainees' thought each of these skills and/or abilities were to learn and/or gain. The final aim of the study was to evaluate trainees' knowledge of these skills and/or abilities before and after training.

5.1 Person Analysis

In light of the method of participant recruitment used in the present study, there is a strong possibility that the sample of trainee respondents is not representative of the general population of 4WD trainees.

The overall characteristics of the present sample indicate 4WD trainees to be New Zealand European males aged in their late 30's, married with two children. Trainees had been to Secondary school, with most having undertaken some form of further

learning. Trainees had been in their present occupations for a small number of years and are employed mostly by Government Agencies. The majority of trainees held at least one drivers' licence with half having had no 4WD training.

5.1.1 *Research Question One*

What are the personal characteristics of trainees who participated in 4WD courses?

The majority of the trainees were relatively young, being less than 40 years of age, with all three females being between 20 and 29 years of age. Almost two thirds of trainees were in committed relationships, and classified themselves as either married, or in a de facto marriage. Half the trainees had no children and the other half had at least two children. Almost three-quarters of the trainees had a strong ethnic identity, identifying themselves as New Zealand Maori, or New Zealand European. The remaining trainees identified as 'other', without specifying an ethnic identity.

Trainees were well educated, with all completing secondary school up to the 5th form and with a further third going on to complete the 7th form. Perhaps an indication of trainees' willingness to achieve was the fact that all trainees had participated in further education past high school, with almost three-quarters having undertaken some tertiary education.

All trainees were employed at the time of the training, with over half of the trainees being employed by either the Wellington City or Regional Councils. Over three-quarters of the trainees had been employed in their current jobs for less than 5 years.

Out of 14 trainees, two did not hold a current drivers licence of any sort. Unfortunately there was no question asking why these two were unlicenced, so one can only speculate

that they could possibly have never sat their drivers licence or they could have lost their licence through unlawful driving behaviour. Half of the trainees held only one licence, while the remaining half held either two or more licences. Holding more than one licence could reflect a diverse background of trainees' and other licences could be either for work or recreational purposes.

5.1.2 *Research Question Two*

What 4WD experience do trainees have before training?

Over half of the trainees had no 4WD training before this training course, therefore one would assume these trainees to be unfamiliar with 4WD vehicles. Of those that had had training, almost equal numbers had been taught by a professional, through informal sources, and as a mixture of both training types. A study undertaken by Tormoehlen and Sheldon (1996) found that 'friends' were the most frequent form of safety training involving all terrain vehicles when interviewing a sample of people ranging between 13 and 19 years of age. The results of this study are somewhat different in training types, perhaps due to the older trainees that participated in the present study.

5.1.3 *Research Question Three*

Do trainees belief in their handling of a 4WD vehicle, increase after training?

Trainees' scores for their self-report belief in their handling of a 4WD vehicle increased or remained constant after training. An increased score between Q.1A and Q.2 indicated that trainees believed they were more capable of handling a 4WD vehicle. A decreased score between Q.1A and Q.2 would have meant that trainees believed they were less capable after training of handling a 4WD vehicle. Each group increased its mean score value by between .067 and 1.00 scale scores after training. These results indicate that training has helped boost trainees' belief in their handling of 4WD

vehicles. Such results are similar to those of Bandura (1986). Bandura (1986) states that those trainees' that are trained to believe they can successfully do the task or activity they have been trained to do, will after training have more belief in one's ability to perform that specific task or activity in real life situations.

5.1.4 *Research Question Four*

Do trainees belief in their driving ability in a 4WD vehicle change after training?

Yes, the trainees' belief in their driving ability in a 4WD vehicle did change. All three trainee groups had increased scores after training, by between 0.55 and 0.80 scale scores. All individual trainee scores increased. An increase in scores translates into trainees having a more positive belief in their driving ability after training. Again, such results can be paralleled to those of Bandura (1986). Those trainees which are trained to believe that they can successfully perform the task they have been trained to do, should after training have more belief in their abilities to perform such tasks when they encounter them. On reflection, individual item means and standard deviations support the increased scale scores for the trainees. All item means increased after training by between 0.40 and 1.08 points. The significant t-test supports the fact that there was a uniform shift in scores across all trainees.

5.1.5 *Research Question Five*

Do trainees' SLOC scores remain constant after training?

No, trainees' SLOC scores did not remain constant after training. After training, the mean for Group One went down 1.25 points and the standard deviation decreased. The mean for Group Two also decreased, by 5.00 points from +1.00 to –4.00. Contrary to the previous two groups, the mean for Group Three went up from –4.33 to + 1.33. A positive score in relation to others in the same sample indicates that an individual or a

group has a more internal orientation. The mean across all three groups before training was –0.40 and went down to –0.70 after training, which was a decrease of 0.30 scale points. Not reflected in the group means is the fact that all trainees decreased their SLOC scores after training and this indicated they became more externally oriented in their beliefs about safety in the workplace. These results are not the same as those found by Jones and Wuebker (1993), and Marlatt and Marques (1977). Both Jones and Wuebker (1993) and Marlatt and Marques (1977) suggested that appropriate training and education can contribute to more internal safety locus of control orientations. However, in this instance it can be seen that after training, individual trainee scores reflect a more external safety locus of control orientation. These results could be explained by research investigating road safety behaviour by Gregersen et al (1996). They suggested that a common feature as to why driver training often fails to improve safety is the concept of behavioural adaptation. This refers to drivers using improved driving skills not only for improved safety, but also for more mobility, pleasure and being more adventurous. Gregersen et al (1996) together with Jorgensen (1993) both suggested that after training, drivers overestimate the safety effects of a training programme, and hence they underestimate the risk involved in driving.

5.1.6 *Research Question Six*

Do trainees' ADVS scores remain constant after training?

There was no change in Group One's ADVS mean score and after training. However, Group Two's ADVS mean score was lower after training, shifting its position from a general disagreement with the statements to a more neutral stance. Opposite to Group Two, Group Three had a higher mean after training, shifting its mean from a neutral stance to general disagreement with the statements in the scale. The increase in mean scores indicates that trainees in Group Three were more likely to commit driving

violations following training. Such a change in personal attitudes could be related to the concept of behavioural adaptation (Gregersen et al., 1996). After training, trainees who believe they now have the appropriate skills and/or abilities to handle situations as they occur could underestimate the amount of risk involved in future driving situations. Such an underestimation in risk is reflected by the increased ADVS mean group score for Group Three.

5.1.7 *Research Question Seven*

Is there a link between Accident rate, type and severity, injury severity and ADVS scale scores?

Having only 3 people indicate that they had had an accident, did not provide enough data for any viable conclusion to be made about any relationship between accident rate, type, severity, injury severity and any attitudes to driving violations. However, of those that did have accidents, no one was injured, only a building/structure or one other vehicle was involved. The pre-training ADVS scores of those that had accidents were 24, 25 and 22. In 1995 Parker et al. found high scores on the Driving Behaviour Questionnaire (DBQ), a measure of peoples' tendency to commit driving violations, was associated with accidents in general. Such an association could also be said of high ADVS scores and accidents in this study. Trainees 2, 8 and 9 had the highest ADVS scores, and trainees 2 and 9 had both had accidents. In each accident, there was either minor or panel damage caused, with all accidents being active shunts, meaning the driver of those cars were the people that caused the accidents. The results support the use of the ADVS as a marker of accident liability as found by West and Hall (1997).

When observing the internal item means, there is an increase for all items after training, showing that trainees disagreed more with each item after training. With the external

item means, the same pattern has occurred, except for item 14, with which trainees have agreed with more after training.

5.2 Organisational Analysis

5.2.1 *Research Question Eight*

Why do trainees participate in the training courses?

The majority of trainees were at training either to satisfy an employment requirement or they choose to attend themselves. Choosing to attend the training by themselves could have had an effect on the amount learnt by such trainees, as motivation has been found to be a determining factor in increasing training effectiveness (Noe & Schmitt, 1986; Blum & Naylor, 1968). The two trainee's who were directed to go, could therefore be biased in what knowledge they gain from the training.

5.2.2 *Research Question Nine*

To what extent do trainees perceive a need for training?

Not one person indicated they did not need the training. All trainees indicated they needed the course. The need for training could affect the amount of motivation that trainees had in the course. Knowing that they needed the training could in itself provide the motivation for trainees to want to learn from the training. This motivation could then influence training effectiveness (Bandura, 1968).

5.3 Task Analysis

5.3.1 *Research Question Ten*

What skills and/or abilities do trainees expect to learn and/or gain from the training?

Across all three groups of trainees, ten items were found in common that trainees wanted to learn about or gain experience in. These skills were;

- After learning the appropriate skills, to also be aware of their own abilities as a driver of a 4WD vehicle.
- To have the confidence to be able to handle a 4WD vehicle in most conditions that they would encounter.
- To be aware of the potential dangers and risks associated with 4WD driving.
- To know correct gear selections of 4WD's and also to learn about engine braking.
- To be aware of the limitations and/or capabilities of individual 4WD vehicles.
- To improve their reversing skills and use of mirrors when their visibility is limited.
- To learn safe river crossing techniques and to know how to test for water levels.
- To learn about safety, learn how to be a competent driver in control of a 4WD vehicle.
- Learn how to handle a 4WD vehicle on steep gradients in both wet and dry conditions.
- To learn about the technical make-up and to have a mechanical appreciation of how a 4WD vehicle works.

5.3.2 *Research Question Eleven*

How useful do trainees believe these skills and/or abilities are to learn and/or gain?

All items were indicated as being useful to learn on the 5-point scale ('1-very useful', to '5-not at all useful'). Nine out of ten items had values between 1.08 and 1.62, with only one item having a value greater than 2 (2.16). These low scores indicate that trainees believe all items would be useful in training.

5.3.3 *Research Question Twelve*

How much do all trainees know about each skill and/or ability before training?

Before training, trainees were quite limited in their knowledge of each item. On a scale

from 1 to 5 ('1-everything', '3-enough', to '5-nothing at all'), no one item had a mean of 3.00. The item trainees indicated they knew enough about before training was item 1, with a mean of 3.51. The item trainees indicated they knew the least about before training was item 7, with a mean of 4.42, reflecting that trainees knew between 'a little bit' and 'nothing at all' about this item.

5.3.4 *Research Question Thirteen*

Has trainees' knowledge of each skill and/or ability changed after training?

Using the scores from only those 14 trainees who completed both Q.1B and Q.2, it can be seen that trainees' knowledge increased on each item after training. Seven out of ten items after training had means lower than 3.00, with these items decreasing up to 1.22 scale points. Of the three items that did not have means lower than three, their means decreased after training between 0.36 and 1.00 scale points. The subsequent drop in scores reflects the fact that trainees' did have more knowledge of skills and/or activities associated with 4WD vehicles after training. Therefore it is a reasonable assumption that trainees gained their knowledge from the training course itself.

The knowledge scores were better after training on those skills and/or abilities reflecting that the training needs analysis was successful in identifying those skills and/or abilities that trainees needed to learn and/or gain.

All trainees as a group had more belief in their own handling and driving of 4WD vehicles after training which was further supported by the significant t-test. Overall, trainees SLOC decreased contrary to what was expected from the training and ADVS scores remained constant.

5.4 Methodological Considerations

There are myriad of considerations that have to be taken into account when reviewing this study and there are several factors which may contribute to perhaps incredulous unstable findings.

The small group size for the sample that completed Q.1 and the subsequent division of this group into three sub-groups makes any comparisons of data particularly unreliable. The main consideration has to be with the number of trainees that participated in all facets of the study. The small numbers that went through all three phases did not constitute a large enough sample for generalisations to be made about the trainees or the training course in general.

Additionally, when dividing the trainees into separate genders, marital status groups, and other demographic variables, there were some very small numbers in each group.

Additionally, because there has been a time lapse between when the actual training occurred and the follow-up questionnaire being distributed, one cannot rule out distortion of facts, perhaps due to retrospective recalling of information. Originally there were 36 trainees approached to participate in the study. The low participation rate in Q.1A and Q.2 after verbal agreement to participate by all approached could be related to several different variables. Even though the training company is based in the Manawatu area, participants in the three courses came from a geographically dispersed area, and from all over New Zealand. This geographical challenge in access to, and communication with trainees could have affected the number of trainees who participated in all aspects of the study. Such reasons for low participation would be that the training courses were not for one company or group of people who were employed in the same work environment. Additionally due to trainees being employed by different companies, some trainees' may have had heavy workloads, resulting in less time to complete the mail-back sections of the study.

The method of data collection through the use of questionnaires may have provided the researcher with incomplete information. Because both Q.1A, and Q.2 were completed by trainees in private there is some room for error as to whether the results of this study are absolute and definite.

A further disadvantage is seen in the time delay between each groups training date and the completion of Q.2. Group 1 and Group 3 undertook their respective training days six weeks apart (October and December 1997), but completed Q.2 at the same time (July, 1998).

5.5 Research Constraints

The research was oriented towards a more comprehensive sample size to justify the use of statistical analyses to be undertaken. Due to geographical accessibility of the trainees it was difficult to maintain a good line of communication between the researcher and trainees. The subsequent small numbers of trainees that completed all parts of the research meant that any results, and conclusions drawn are difficult to stand on their own based on only one piece of research.

5.6 Future Research

Justification for future research would be to identify a more complete sample of trainees who participate in 4WD training courses. From this, there would then be a comprehensive sample basis on which to compare changes over time in the make-up of trainee groups that undertake the training courses.

In any further studies, some attention to underlying personal factors such as motivation and eagerness to succeed could be investigated. Reasons for these areas being chosen are reflected in the results of this study in particular, with reference to transfer of training and training effectiveness (Bandura, 1986).

The time lapse between training and follow-up information being provided would need to be more uniform across each group of trainees. In this instance there was a difference of six weeks between Group 1 and Group 3 undertaking training, but both groups completed Q.2 at the same time.

The limited number of trainees in the sample meant that those that had had accidents was low, therefore resulting in inconclusive findings between accidents and ADVS scores. Further studies would need to include sufficient numbers for any sub-grouping analyses to be significant. Larger numbers are needed to compare results between studies, but only if demographic information is similar.

5.7 Conclusion

In conclusion the results from the present study support the use of the ADVS as a predictor of accident liability. The training has resulted in an increase in knowledge across all trainees that completed Q.1 and Q.2. This increase in knowledge therefore reflects on the training as being able to help increase knowledge of those trainees' who undertake the courses. The usefulness of the SLOC scale has not being shown clearly in this study. SLOC scores compared before and after training have not produced any clear direction in which trainees safety orientation has shifted, contrary to previous research that suggested training would influence SLOC scores in a more internal orientation (Jones, 1980; Marlatt, 1977).

For trainees, training resulted in more capable beliefs of how well they could handle and drive a 4WD vehicle in different situations. The needs analysis did identify those skills and/or abilities trainees believed they needed to learn and/or gain from training, and after training, trainees knew more about those skills and/or abilities.

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APPENDIX A

Information sheet for the study

AN EXPLORATORY TRAINING NEEDS ANALYSIS

INFORMATION SHEET

Hello and Welcome.

My name is Leona Manna, and I am doing a Masters Thesis in Psychology at Massey University in Palmerston North this year. For my Masters Thesis I am required to do a full year of research in an area of my choosing. Along with **'The Company'** I have chosen to do a training needs analysis and evaluation of a Level Two four wheel drive training course. To do this I need to include trainees who undertake the course, their immediate supervisors, employers and trainers. This will ensure that I, as researcher, obtain a comprehensive view of the training course, to evaluate its effectiveness.

Researchers involved in this study are:-

Researcher:	Leona Manna – a student at Massey University currently undertaking a Masters Degree.
Contact Phone Number:	(06) 356 9099 (Psychology Department)
Supervisor:	Associate Professor, J.A.Brook.
Contact Phone Number:	(06) 350 4121

If you agree to participate in this study, filling in the questionnaire implies your consent. Each group of participants will have two questionnaires to complete. Questionnaire one is in two parts. All questionnaire "1"'s will be completed the day before the course, and the trainees questionnaire "1-B" will be completed the morning before the course. All other questionnaire "1-B"'s must be completed before questionnaire two. Questionnaire two will be distributed at least four weeks after the course was completed. Questionnaire "1" for the trainees will take a maximum of 40 minutes to complete. All other questionnaires will take a maximum of ten minutes to complete.

Each questionnaire will be uniquely coded with the initials of each participants first and last name, and the day and month of their birth, eg., for myself **LM0404** (Leona Manna, born on April the fourth). The names of participants will only be known to myself, as the researcher, and my supervisor. No one will be able to be identified from the reading of any report. All raw data will be kept in a secure place and only summary data will be reported. We are interested in evaluating the course itself, not the individual participants.

If you accept the invitation to participate in the study, you have the right to refuse to answer any questions and to withdraw from the study at any time, and you have the right to ask any further questions at any time. If you decline to participate, that decision will not affect your employment in any way.

A brief summary of results will be available from the researcher on request.

APPENDIX B

Cover sheet of Questionnaire 1A informing participants of their agreement to participate

AN EXPLORATORY TRAINING NEEDS ANALYSIS

TRAINEE QUESTIONNAIRE 1A

I have read the information sheet and have had the details of the study explained to me. My questions have been answered to my satisfaction, and I understand that I may ask further questions at any time.

I understand that through completing this questionnaire, I have implied my consent to be a participant in the study, but understand that I may withdraw from the study at any time. I understand that I am free to decline to answer any question(s).

I agree to provide information to the researcher for their study by completing a series of questionnaires on the understanding that it is completely confidential, and that I can not be identified in any final written reports from the study.

Signed: .....

Name: .....

Date: .....

PLEASE FILL IN THE ID CODE AS FOLLOWS-

The first initial of your first name goes in the first box
The first initial of your last name goes in the second box
The next two boxes are the day you were born
The last two boxes are the month you were born

An example, if your name is Bob Jones, and you were born on the 7 of August . The ID CODE would be **BJ0708**

ID CODE

APPENDIX C

Copy of Q.1A

BACKGROUND INFORMATION QUESTIONS

1 How old are you? _____(years)

2 Are you? ☐ Male ☐ Female

3 What is your current marital status?

☐ Single ☐ Married (including defacto)

☐ Divorced ☐ Widowed

4 How many children do you have?

☐ None ☐ 1

☐ 2 ☐ 3 or more

5 Which ethnic group do you identify with? (tick all that apply)

☐ New Zealand Maori ☐ New Zealand European

☐ Pacific Islander ☐ Asian

☐ Other_____

EDUCATION BACKGROUND QUESTIONS

6 What form did you complete in high school?

☐ Did not attend ☐ 3rd form ☐ 4th form

☐ 5th form ☐ 6th form ☐ 7th form

7 Have you had any further training past high school? ☐ Yes ☐ No

8 If yes, please indicate what type of training:

☐ Polytech ☐ University ☐ Marae / Iwi based

☐ NZ employment courses (Access schemes, on the job training, etc...)

☐ Teachers training college ☐ Other _____

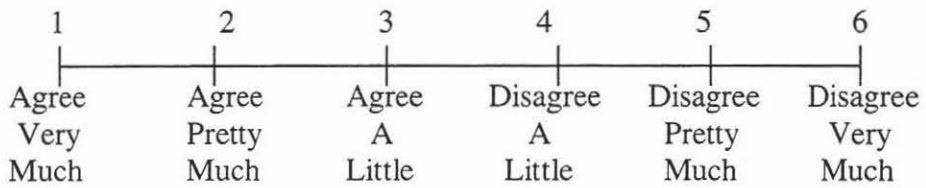
EMPLOYMENT QUESTIONS

9 Who do you work for? (DOC, Energy Direct, etc...)_____

10 How long have you worked for this employer? : _____years_____months

11 What is your work title?: _____

12 Using the following scale, please indicate at the end of each statement how much you agree with it.



- If employees follow all company rules and regulations, they can avoid many on-the-job accidents ☐
- Industrial accidents are usually caused by unsafe equipment and poor safety regulations ☐
- Occupational accidents and injuries occur because employees do not take enough interest in safety ☐
- Avoiding accidents is a matter of luck ☐
- Most accidents and injuries at work cannot be avoided ☐
- It is the company's responsibility to prevent all accidents at work ☐
- Most industrial accidents are due to employee carelessness ☐
- There are so many dangers in this world that you never know how or when you might be in an accident ☐
- Most accidents that result in employee injuries are largely preventable ☐
- No matter how hard employees try to prevent them, there will always be on-the-job accidents ☐
- Whether people get injured or not is a matter of fate, chance or luck ☐
- Employees' accidents and injuries result from the mistakes they make ☐
- Most on-the-job accidents can be blamed on poor management ☐
- Most injuries are caused by accidental injuries outside people's control ☐
- People can avoid getting injured if they are careful and aware of potential dangers ☐
- There is a direct connection between how careful employees are and the number of on-the-job accidents they have ☐
- Most accidents are unavoidable ☐

VEHICLE INFORMATION

13 Do you work alone in your job where a vehicle is involved? ☐ Yes ☐ No

14 If Yes, how much time per day on average? _____ hours _____ minutes

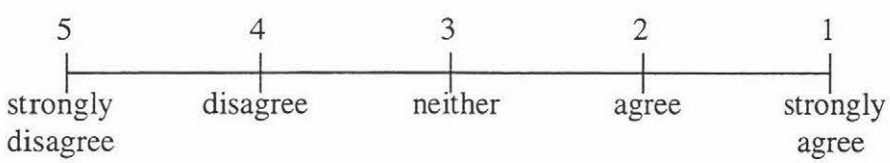
15 What driver's license/s do you hold? (A, B, C, etc...)_____

16 Length of time for each type of license (years): _____ _____

_____ _____ _____ _____ _____

DRIVING ATTITUDES

17 Please indicate which number on the following scale best fits each of the sevens statements



- Decreasing speed limit on the motorway is a good idea ☐
- Even at night-time on quiet roads it is important to keep within the speed limit ☐
- Drivers who cause accidents by reckless driving should be banned from driving for life ☐
- People should drive slower than the speed limit when it is raining ☐
- Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane ☐
- In towns where there are a lot of pedestrians, the speed limit should be 30 km/h ☐
- Penalties for speeding should be more severe ☐

4WD VEHICLE INFORMATION

18 Have you ever has any 4WD training before? ☐ Yes ☐ No

19 If yes, please indicate what type of training:

☐ Professional (Course with an Instructor)

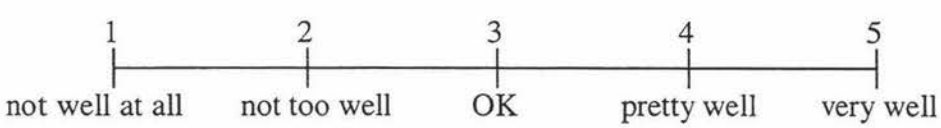
☐ Informal (Friend, relative, etc...)

☐ Mixture (professional and informal)

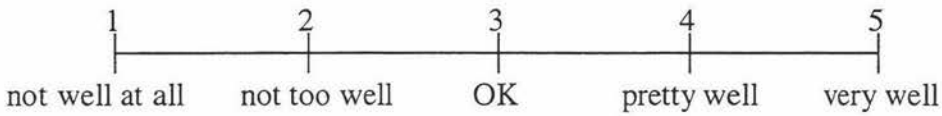
☐ Other_____

20 How long have you been driving a 4WD vehicle? _____yrs _____mths

21 Please indicate below how well you can drive a 4WD vehicle:



22 Using the following scale, please indicate after each statement how well you believe you handle 4WD situations:



- Driving forward through uneven dry ground ☐
- Driving forward through uneven boggy ground ☐
- Reversing through uneven dry ground ☐
- Reversing through uneven boggy ground ☐
- Driving forward down a wet hill ☐
- Reversing down a wet hill ☐
- Driving forward up a wet hill ☐
- Driving forward around a slope on a wet hill ☐
- Reversing around a slope on a wet hill ☐
- Driving forward up a wet hill and stopping mid way up ☐
- Driving forward through a ford ☐
- Reversing back through a ford ☐
- Other conditions (snow, ice, sand) ☐

VEHICLE ACCIDENT INFORMATION QUESTIONS

23 In the last three years, have you been involved in any motor vehicle accidents?

☐ Yes ☐ No

24 If yes, how many? _____

25 Please indicate in how many of these accidents **you were the driver** _____

26 Were any of these accidents **during work time**? ☐ Yes ☐ No

27 If Yes, how many? _____

28 Of the accidents you have had in the last 3 years, please tick the box at the end of the statement if they were the **same as any that are described below**:

- I hit another vehicle from behind ☐
- I hit or was hit by another vehicle while pulling out of a side road, slip road, from a parked position or turning left off a main road ☐
- I hit another vehicle or abject while reversing ☐
- The vehicle went out of control ☐
- I was hit from behind ☐
- I was hit or hit by another vehicle that pulled out of a side road, slip road, from a parked position or turning left off a main road ☐
- I was hit by a vehicle that was reversing ☐

29 Please indicate at the end of each statement how many of those types of accidents **you have been involved in over the last three years**

(A) Vehicle damage

- There was **no damage** to the vehicle I was in ☐
- The vehicle I was in had a **minor dent** ☐
- There was some **panel damage** to the vehicle I was in ☐
- At least **50%** of the vehicle I was in was damaged ☐
- About **75%** of the vehicle I was in was damaged ☐
- The vehicle I was in could **no longer be driven** ☐
- The vehicle I was in was **written off** ☐

(B) Degree of injury

- At least one person suffered minor bruising, **treated at the scene** ☐
- At least one person suffered **broken bones** ☐
- At least one person was **hospitalised** ☐
- There was a **fatality** due to the accident ☐

(C) Vehicles involved

- Only the **vehicle I was in** was involved ☐
- There was the vehicle I was in **and a building or structure** ☐
- There was at least **one other vehicle** involved in the accident ☐
- There was **more than one other vehicle** involved ☐

(D) Number injured

- **No-one** was injured ☐
- There was only **one person** injured ☐
- There were **two people** injured ☐
- There were **more than two** people injured ☐

PRECOURSE QUESTIONS - A

As trainees in the Fleetwise Driver Training Course you may have certain **expectations** about the course which you will attend. The remaining questions are about the course

30 What is your **main reason** for attending the course? (Please tick)

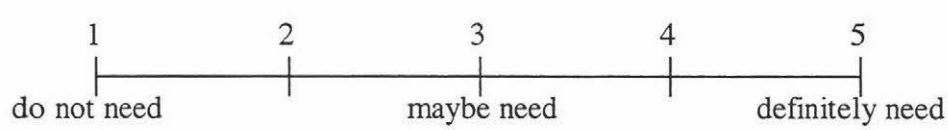
☐ Told to attend ☐ Employment requirement

☐ Choose to attend ☐ Pay increase

☐ To take a break from work ☐ Other _____

☐ Not sure

31 Please indicate below how strongly you believe you need this course:



32 Please list below the driving skills/abilities you expect to learn/gain from the 4WD course?

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

8. _____

9. _____

10. _____

11. _____

12. _____

13. _____

14. _____

PLEASE CHECK THAT YOU HAVE FILLED IN YOUR ID CODE

THANK – YOU VERY MUCH FOR PARTICIPATING.

APPENDIX D

Copy of Q.1B

Group 1

Group 2

Group 3

AN EXPLORATORY TRAINING NEEDS ANALYSIS

TRAINEE QUESTIONNAIRE 1B

GROUP ONE

On the following page are listed common driving skills and/or abilities that trainees have indicated they expect to learn and/or gain from the 4WD training course. Please read each one, and then answer the questions below that list.

PLEASE FILL IN THE ID CODE AS FOLLOWS-

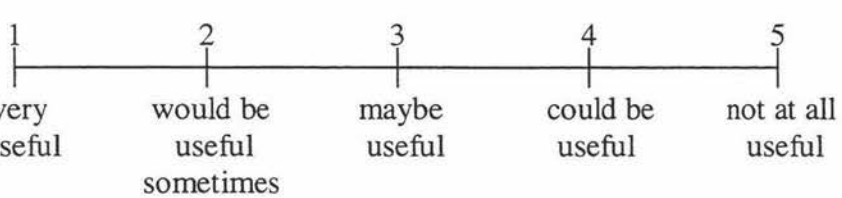
The first initial of your first name goes in the first box
The first initial of your last name goes in the second box
The next two boxes are the day you were born
The last two boxes are the month you were born

An example, if your name is Bob Jones, and you were born on the 7 of August . The ID CODE would be **BJ0708**

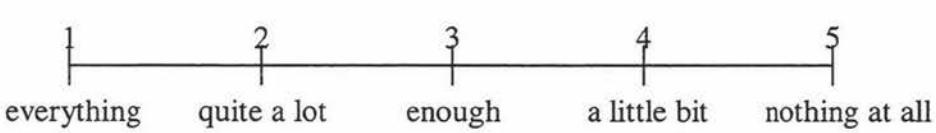
ID CODE

	A Useful	**B** Already Know
1. Safety – Learn how to be competent and in control of a 4WD vehicle	☐	☐
2. Routes – Assess a safe route, evaluate and plan where to drive first	☐	☐
3. Improving reversing skills, use of mirrors when visibility is limited	☐	☐
4. Knowing how to handle steep gradients in both wet and dry conditions	☐	☐
5. Knowing correct gear selection, and knowledge of engine braking	☐	☐
6. Learning safe river crossing techniques, and how to judge water levels	☐	☐
7. After learning the correct skills of 4WD driving, to also be aware of your own abilities when driving	☐	☐
8. Learn the technical make-up and have a mechanical appreciation of 4WD vehicles	☐	☐
9. Have the confidence to handle a 4WD vehicle in most situations	☐	☐
10. Be aware of the potential dangers and risks of 4WD driving	☐	☐
11. Learn current theory of and experience in driving "today's" 4WD vehicles	☐	☐
12. Be aware of the capabilities and / or limitations of individual 4WD vehicles	☐	☐

1. Now indicate in column **A** (above) how **useful** learning each point is on the following scale



2. Please indicate in column **B** (above) how much you **know about** each skill using the following scale



AN EXPLORATORY TRAINING NEEDS ANALYSIS

TRAINEE QUESTIONNAIRE 1B

GROUP TWO

On the following page are listed common driving skills and/or abilities that trainees have indicated they expect to learn and/or gain from the 4WD training course. Please read each one, and then answer the questions below that list.

PLEASE FILL IN THE ID CODE AS FOLLOWS-

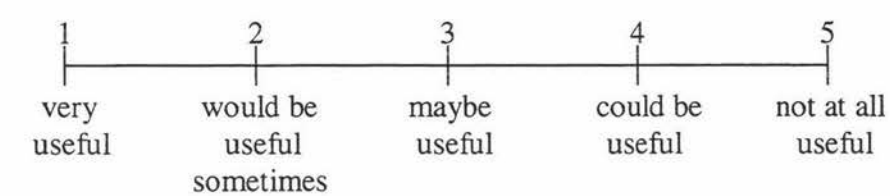
The first initial of your first name goes in the first box
The first initial of your last name goes in the second box
The next two boxes are the day you were born
The last two boxes are the month you were born

An example, if your name is Bob Jones, and you were born on the 7 of August . The ID CODE would be **BJ0708**

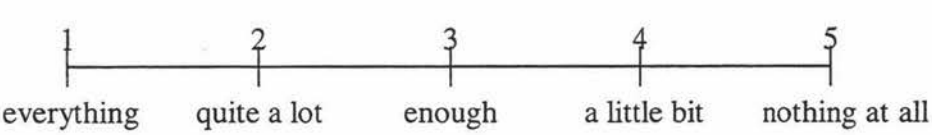
ID CODE

	A Useful	**B** Already Know
1. Safety – Learn how to be competent and in control of a 4WD vehicle	☐	☐
2. Routes – Assess a safe route, evaluate and plan where to drive first	☐	☐
3. Improving reversing skills, use of mirrors when visibility is limited	☐	☐
4. Knowing how to handle steep gradients in both wet and dry conditions	☐	☐
5. Knowing correct gear selection, and knowledge of engine braking	☐	☐
6. Learning safe river crossing techniques, and how to judge water levels	☐	☐
7. After learning the correct skills of 4WD driving, to also be aware of your own abilities when driving	☐	☐
8. *Learn* the technical make-up and have a mechanical appreciation of 4WD vehicles	☐	☐
9. Have the confidence to handle a 4WD vehicle in most situations	☐	☐
10. Be aware of the potential dangers and risks of 4WD driving	☐	☐
11. Be aware of the capabilities and / or limitations of individual 4WD vehicles	☐	☐
12. Knowledge of correct vehicle accessories such as wheels and tyres to have on individual 4WD vehicles	☐	☐

1. Now indicate in column **A** (above) how **useful** learning each point is on the following scale



2. Please indicate in column **B** (above) how much you **know about** each skill using the following scale



AN EXPLORATORY TRAINING NEEDS ANALYSIS

TRAINEE QUESTIONNAIRE 1B

GROUP THREE

On the following page are listed common driving skills and/or abilities that trainees have indicated they expect to learn and/or gain from the 4WD training course. Please read each one, and then answer the questions below that list.

PLEASE FILL IN THE ID CODE AS FOLLOWS-

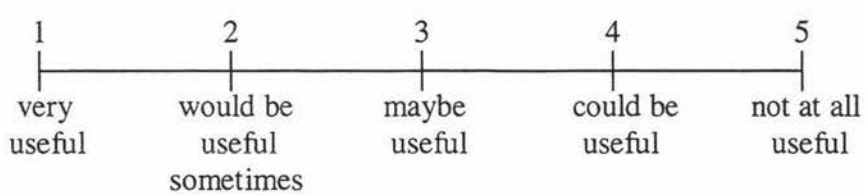
The first initial of your first name goes in the first box
The first initial of your last name goes in the second box
The next two boxes are the day you were born
The last two boxes are the month you were born

An example, if your name is Bob Jones, and you were born on the 7 of August . The ID CODE would be **BJ0708**

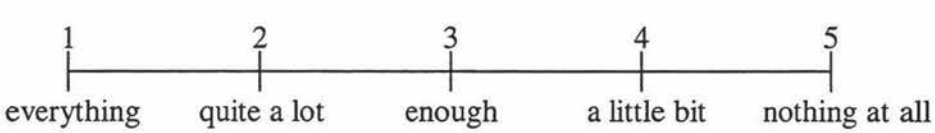
ID CODE

	A Useful	**B** Already Know
1. Safety – Learn how to be competent and in control of a 4WD vehicle	☐	☐
2. Routes – Assess a safe route, evaluate and plan where to drive first	☐	☐
3. Improving reversing skills, use of mirrors when visibility is limited	☐	☐
4. Knowing how to handle steep gradients in both wet and dry conditions	☐	☐
5. Knowing correct gear selection, and knowledge of engine braking	☐	☐
6. Learning safe river crossing techniques, and how to judge water levels	☐	☐
7. After learning the correct skills of 4WD driving, to also be aware of your own abilities when driving	☐	☐
8. Learn the technical make-up and have a mechanical appreciation of 4WD vehicles	☐	☐
9. Have the confidence to handle a 4WD vehicle in most situations	☐	☐
10. Be aware of the potential dangers and risks of 4WD driving	☐	☐
11. Be aware of the capabilities and / or limitations of individual 4WD vehicles	☐	☐
12. Knowledge of correct vehicle accessories such as wheels and tyres to have on individual 4WD vehicles	☐	☐
13. Learn current theory of and experience in driving "today's" 4WD vehicles	☐	☐
14. Learn techniques of how to recover vehicles out of "tricky" situations	☐	☐

1. Now indicate in column **A** (above) how **useful** learning each point is on the following scale



2. Please indicate in column **B** (above) how much you **know about** each skill using the following scale



APPENDIX E

Raw data obtained from Q.1A to form Q.1B

Group 1

Group 2

Group 3

Original responses made by Group 1 on Q.1A

Skills and/or abilities trainees expected to learn and/or gain from the training

---

How to handle on steep ground
Better understanding of tyre types
Knowledge of torque
Better use of gears
More confidence in handling
Better knowledge of a vehicles capabilities
Handling in steep wet conditions
Reversing skills
Up to date experience in driving modern vehicles
Up to date theory in driving modern vehicles
Knowledge of safety
Awareness of types of risk and potential dangers when driving
Technical understanding
Knowledge of limitations of work owned vehicles
Be a safe and competent driver
How to assess a safe route
When and where to cross rivers
Aware of my own abilities

NB: All points refer to 4WD vehicles

Original responses made by Group 2 on Q.1A

Skills and/or abilities trainees expected to learn and/or gain from the training

---

Ability to drive on wet, rough uneven ground
Know limits of vehicles
Know how to ford rivers safely
Drive better
Safely operate a vehicle
Drive on slopes in both wet and dry weather
Techniques for getting unstuck
Getting through bogs and rivers
Knowing where to drive safely
Recognizing potential hazards
Understanding my vehicles capabilities
Knowing my capabilities with a vehicle
Confidence in driving
Getting experience in driving modern vehicles
Learning about driving modern vehicles
Knowing/learning what to do in varying conditions
Awareness of dangers
Do's and don'ts of driving
Learn new skills
Navigation through stream and water bodies
Driving up steep slopes
Reversing using wing mirrors
Reversing in tricky situations
Driving over rough ground
Use of gears, handling, technical know how
Ability to negotiate rough terrain
How to get out of tricky situations
Ability to stay in control of vehicle in adverse conditions

NB: All points refer to 4WD vehicles

Original responses made by Group 3 on Q.1A

Skills and/or abilities trainees expected to learn and/or gain from the training

---

The full control of a vehicle in most situations
Confidence in driving
How to ford a stream
Driving in loose gravel and sand
Correct procedure to cross a small river
How to drive better
How to act/react in a given situation
Fundamental skills with respect to steering straight
Getting the theory and experience in driving modern vehicles
What to do to get out of a situation
What not to do to get into a tricky situation
Know the capabilities of my vehicle
Knowing when to use certain gears
Different types of tyres and their advantages/disadvantages
What weather conditions are permissible for driving
Good common sense behaviour and choices
Competent standard
Understand the limitations of my vehicle
The need for driving in a group as to driving alone
Finding safe routes to follow
Improving how to reverse a vehicle
Best way to drive when it is hard to see

NB: All points refer to 4WD vehicles

APPENDIX F

Copy of Q.2

AN EXPLORATORY TRAINING NEEDS ANALYSIS

TRAINEE QUESTIONNAIRE "2"

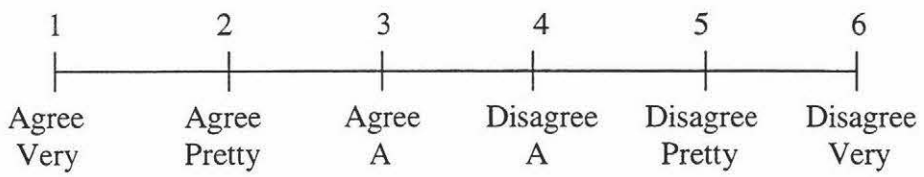
PLEASE FILL IN THE ID CODE AS FOLLOWS-

The first initial of your first name goes in the first box
The first initial of your last name goes in the second box
The next two boxes are the day you were born
The last two boxes are the month you were born

An example, if your name was Bob Jones and you were born on the 7 of August. The ID CODE would be **BJ0708**

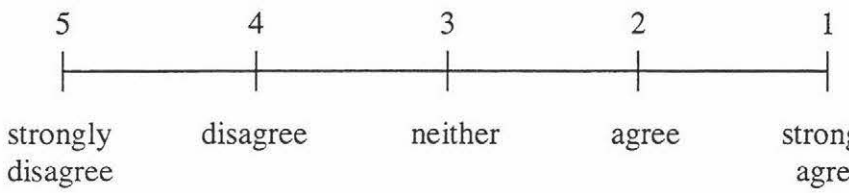
ID CODE

1 Using the following scale, please indicate at the end of each statement how much you **agree** with it.



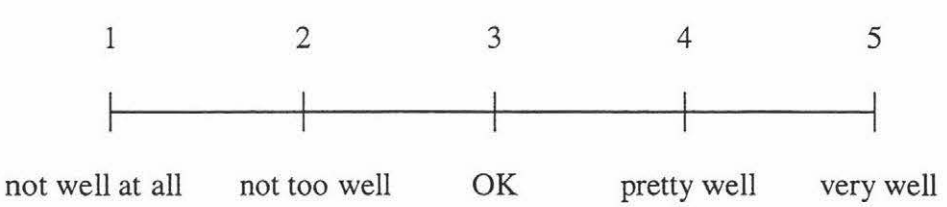
- If employees follow all company rules and regulations, they can avoid many on -the-job accidents ☐
- Industrial accidents are usually caused by unsafe equipment and poor safety regulations ☐
- Occupational accidents and injuries occur because employees do not take enough interest in safety ☐
- Avoiding accidents is a matter of luck ☐
- Most accidents and injuries at work cannot be avoided ☐
- It is the company's responsibility to prevent all accidents at work ☐
- Most industrial accidents are due to employee carelessness ☐
- There are so many dangers in this world that you never know how or when you might be in an accident ☐
- Most accidents that result in employee injuries are largely preventable ☐
- No matter how hard employees try to prevent them, there will always be on- the -job accidents ☐
- Whether people get injured or not is a matter of fate, chance or luck ☐
- Employees' accidents and injuries result from the mistakes they make ☐
- Most on-the-job accidents can be blamed on poor management ☐
- Most injuries are caused by accidental injuries outside people's control ☐
- People can avoid getting injured if they are careful and aware of potential dangers ☐
- There is a direct connection between how careful employees are and the number of on-the-job accidents they have ☐
- Most accidents are unavoidable ☐

2 Please indicate which number on the following scale best fits each of the seven statements

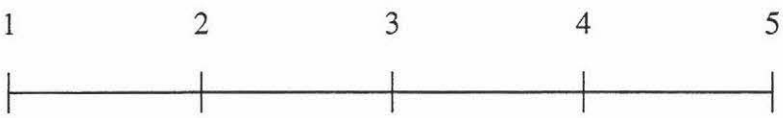


- Decreasing speed limit on the motorway is a good idea ☐
- Even at night-time on quiet roads it is important to keep within the speed limit ☐
- Drivers who cause accidents by reckless driving should be banned from driving for life ☐
- People should drive slower than the speed limit when it is raining ☐
- Cars should never overtake on the inside lane even if a slow driver is blocking the outside lane ☐
- In towns where there are a lot of pedestrians, the speed limit should be 30 km/h ☐
- Penalties for speeding should be more severe ☐

3 Please indicate below how well **you can drive** a 4WD vehicle:



4 Using the following scale, please indicate after each statement how well you believe **you handle** 4WD situations:

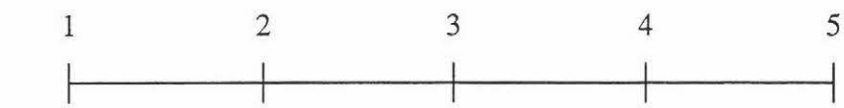


not well at all not too well OK pretty well very well

- Driving forward through uneven dry ground ☐
- Driving forward through uneven boggy ground ☐
- Reversing through uneven dry ground ☐
- Reversing through uneven boggy ground ☐
- Driving forward down a wet hill ☐
- Reversing down a wet hill ☐
- Driving forward up a wet hill ☐
- Driving forward around a slope on a wet hill ☐
- Reversing around a slope on a wet hill ☐
- Driving forward up a wet hill and stopping mid way up ☐
- Driving forward through a ford ☐
- Reversing back through a ford ☐
- Other conditions (snow, ice, sand) ☐

5 After reading the following ten skills and/or abilities, please indicate at the end of each statement using the following scales how much you know about each of those skills and/or abilities.

Please indicate how much you **know about** each skill and/or ability using the following scale



1. Safety – Know how to be competent and in control of a 4WD vehicle ☐

2. Know reversing skills, use of mirrors when visibility is limited ☐

3. Know how to handle steep gradients in both wet and dry conditions ☐

4. Know correct gear selection, and knowledge of engine braking ☐

5. Know safe river crossing techniques, and how to judge water levels ☐

6. Know the correct skills of 4WD driving, to also be aware of your own abilities when driving ☐

7. Know the technical make-up and have a mechanical appreciation of 4WD vehicles ☐

8. Have the confidence to handle a 4WD vehicle in most situations ☐

9. Am aware of the potential dangers and risks of 4WD driving ☐

10. Am aware of the capabilities and / or limitations of individual 4WD vehicles ☐

APPENDIX G

Item means and standard deviations for each group for how useful it would be to learn each skill and/or ability

Group 1

Group 2

Group 3

Item means and standard deviations for Group One in how useful it would be to learn each ability/skill (n=10)

Item	Ability/Skill	M	SD
1	After learning skills be aware of own abilities as a driver	1.11	0.32
2	Have the confidence to handle a 4WD in most conditions	1.56	0.71
3	Be aware of the potential dangers & risks of 4WD driving	1.11	0.32
4	Correct gear selection and knowledge of engine braking	1.33	0.48
5	Be aware of the limitations/capabilities of individual 4WDs	1.67	0.70
6	Improving reversing & mirror use when visibility is limited	1.67	0.50
7	Learn safe river crossing techniques and water levels	1.89	0.57
8	Safety, learn how to competent & in control of a 4WD	1.22	0.42
9	How to handle steep gradients in both wet & dry conditions	1.22	0.42
10	Learn the technical make-up & have a mechanical appreciation of 4WD's	2.22	0.48

Item means and standard deviations for Group Two in how useful it would be to learn each ability/skill (n=7)

Item	Ability/Skill	M	SD
1	After learning skills be aware of own abilities as a driver	1.00	0.00
2	Have the confidence to handle a 4WD in most conditions	1.29	0.49
3	Be aware of the potential dangers & risks of 4WD driving	1.14	0.38
4	Correct gear selection and knowledge of engine braking	1.29	0.49
5	Be aware of the limitations/capabilities of individual 4WDs	1.71	0.76
6	Improving reversing & mirror use when visibility is limited	1.71	0.49
7	Learn safe river crossing techniques and water levels	1.71	0.76
8	Safety, learn how to be competent & in control of a 4WD	1.00	0.00
9	How to handle steep gradients in both wet & dry conditions	1.00	0.00
10	Learn the technical make-up & have a mechanical appreciation of 4WD's	2.29	0.95

Item means and standard deviations for Group Three in how useful it would be to learn each ability/skill (n=20)

Item	Ability/Skill	M	SD
1	After learning skills, be aware of own abilities as a driver	1.30	0.57
2	Have the confidence to handle a 4WD in most conditions	1.30	0.57
3	Be aware of the potential dangers & risks of 4WD Driving	1.05	0.22
4	Correct gear selection and knowledge of engine braking	1.35	0.67
5	Be aware of the limitations/capabilities of individual 4WDs	1.60	0.68
6	Improving reversing & mirror use when visibility is limited	1.55	0.60
7	Learn safe river crossing techniques and water levels	1.45	0.76
8	Safety, learn how to be competent & in control of a 4WD	1.15	0.37
9	How to handle steep gradients in both wet & dry conditions	1.15	0.67
10	Learn technical make-up & have a mechanical appreciation of 4WD's	2.05	1.15

APPENDIX H

Item means and standard deviations for each group for how much they knew about each skill and/or ability at that time

Group 1

Group 2

Group 3

Item means and standard deviations for Group One in how much they know about each ability/skill (n=10)

Item	Ability/Skill	M	SD
1	After learning skills be aware of own abilities as a driver	3.30	0.48
2	Have the confidence to handle a 4WD in most conditions	3.70	0.48
3	Be aware of the potential dangers & risks of 4WD driving	3.70	0.48
4	Correct gear selection and knowledge of engine braking	3.30	0.82
5	Be aware of the limitations/capabilities of individual 4WDs	3.90	0.74
6	Improving reversing & mirror use when visibility is limited	3.20	0.92
7	Learn safe river crossing techniques and water levels	4.20	0.79
8	Safety, learn how to competent & in control of a 4WD	3.60	0.84
9	How to handle steep gradients in both wet & dry conditions	3.90	0.32
10	Learn the technical make-up & have a mechanical appreciation of 4WD's	3.30	0.67

Item means and standard deviations for Group Two in how much they know about each ability/skill (n=7)

Item	Ability/Skill	M	SD
1	After learning skills be aware of own abilities as a driver	3.67	1.03
2	Have the confidence to handle a 4WD in most conditions	4.29	0.49
3	Be aware of the potential dangers & risks of 4WD driving	3.71	0.76
4	Correct gear selection and knowledge of engine braking	4.00	0.58
5	Be aware of the limitations/capabilities of individual 4WDs	4.71	0.49
6	Improving reversing & mirror use when visibility is limited	3.86	0.38
7	Learn safe river crossing techniques and water levels	4.57	0.53
8	Safety, learn how to be competent & in control of a 4WD	4.00	0.00
9	How to handle steep gradients in both wet & dry conditions	4.29	0.49
10	Learn the technical make-up & have a mechanical appreciation of 4WD's	4.29	0.76

Item means and standard deviations for Group Three in how much they know about each ability/skill (n=19)

Item	Ability/Skill	M	SD
1	After learning skills, be aware of own abilities as a driver	3.58	0.77
2	Have the confidence to handle a 4WD in most conditions	3.89	0.74
3	Be aware of the potential dangers & risks of 4WD Driving	3.95	0.71
4	Correct gear selection and knowledge of engine braking	3.84	0.76
5	Be aware of the limitations/capabilities of individual 4WDs	4.32	0.47
6	Improving reversing & mirror use when visibility is limited	3.74	0.65
7	Learn safe river crossing techniques and water levels	4.47	0.70
8	Safety, learn how to be competent & in control of a 4WD	3.79	0.79
9	How to handle steep gradients in both wet & dry conditions	4.26	0.56
10	Learn technical make-up & have a mechanical appreciation of 4WD's	4.00	0.82