

## **Development of a Model Novice Driver Education/Development Curriculum**

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### **Abstract:**

Despite the lack of crash-based evidence, the development and application of driver educational/training programs continues to be advocated in the community as a measure to reduce novice driver crash risk. To influence and direct evidence-based practice in this popular area, the Australian Transport Safety Bureau (ATSB) has funded the development of a best-practice driver education/development program for Australian novice drivers with at least six months of solo driving experience. ATSB retained the authors to research and prepare a model novice driver curriculum program based on best road safety practice and contemporary psychological, educational theory. The authors were also required to develop specifications for a large-scale, crash-based trial of this program in a suitable Australian jurisdiction. This paper provides an overview of the model curriculum developed and the proposed evaluation plan.

### **Introduction**

Novice drivers continue to have a higher level of crash involvement than more-experienced drivers, with the consequence that there is ongoing interest in the development and implementation of effective road safety measures for this group (McKnight & Peck, 2002). The development and application of driver educational/training programs is continually advocated in the community as a measure to reduce novice driver crash risk. However, there is a shortage of crash-based evidence to support such measures (Christie & Harrison, 2003). The Australian Transport Safety Bureau (ATSB) commissioned the authors in early 2004 to develop a “best practice” education/development program for novice drivers that could be subjected to a large-scale, crash-based trial. The contract also required the authors to develop specifications for the large-scale trial of the program. This paper provides an overview of the model curriculum developed and the proposed evaluation plan. A full version of the model program curriculum may be obtained from the ATSB.

## **Development of Model Novice Driver Education/Development Curriculum**

The program, named the Novice Driver Coaching Program, was developed by drawing together empirical and theoretical evidence from the road safety, education, and training literature, and by using the Finnish Stage-2 novice driver education program as a starting point (see Bartl, 2000 for details of the program and Katila et al, 2000 for details of evaluation). It also incorporates best practice in terms of adult learning and the shaping of behaviour and targets the intermediate levels of the EU Project Gadget driver behaviour model, ie *Mastery of Traffic Situations* and *Driving goals & context (journey related)* (see Table1).

In developing the model, the consultants relied heavily on recent reviews of the efficacy, content and orientation of novice driver training, education and development programs and initiatives (Christie, 2001; Christie & Harrison, 2003). This was supplemented by information gained by the first author's visit to Finland in August 2003 to observe Stage 2 novice driver training and to meet with the program developers, administrators and trainers.

**Table 1:** EU Project Gadget Matrix (Driver Behaviour model) (After Hatakka et al, 2002)

<b>Hierarchical levels of behaviour &amp; referring structure of driver training content</b>			
<b>Essential Contents</b>			
	<b>Knowledge &amp; Skills</b>	<b>Risk-Increasing Factors</b>	<b>Self-Evaluation</b>
<b>Goals for life &amp; skills for living (general)</b>	<i>Knowledge about/control over how life goals &amp; personal tendencies affect driving behaviour</i> eg <i>Motives</i>	<i>Risky tendencies</i> eg <i>Acceptance of risk</i> <i>Self-enhancement through driving</i> <i>Use of alcohol &amp; drugs</i>	<i>Self-evaluation</i> eg <i>Personal skills for impulse control</i> <i>Risky tendencies</i>
<b>Driving goals &amp; context (journey related)</b>	<i>Knowledge &amp; skills concerning</i> eg <i>Effects of journey goals on driving</i> <i>Effects of social pressure inside the car</i>	<i>Risks connected with</i> eg <i>Driver's condition (mood, BAC etc)</i> <i>Driving environment (eg urban/rural)</i>	<i>Self-evaluation</i> eg <i>Personal planning skills</i> <i>Typical driving goals</i>
<b>Mastery of Traffic Situations</b>	<i>Knowledge &amp; skills concerning</i> eg <i>Traffic regulations</i> <i>Speed adjustment</i> <i>communication</i>	<i>Risks caused by</i> eg <i>wrong expectations</i> <i>risk increasing driving style</i> <i>vulnerable road users</i>	<i>Self-evaluation</i> eg <i>Strong &amp; weak points of basic traffic skills</i> <i>Personal driving style</i>
<b>Vehicle Manoeuvring</b>	<i>Knowledge &amp; skills concerning</i> eg <i>Control of direction &amp; position</i> <i>Tyre grip &amp; friction</i>	<i>Risks connected with</i> eg <i>Insufficient automatism or skills</i> <i>Unsuitable speed adjustment</i>	<i>Awareness of</i> eg <i>Strong &amp; weak points of basic manoeuvring skills</i> <i>Realistic self-evaluation</i>

Comment and advice was also received from a panel of Australian novice driver experts (ie Prof Tom Triggs, Monash University Accident Research Centre (MUARC), Dr Wendy Macdonald, LaTrobe University and Dr Barry Watson, Centre for Accident Research and Road Safety (CARRSQ), Queensland University of Technology) in respect of the content, emphases and orientation of the model curriculum outline.

Input from the expert panel was further supplemented by comments and feedback from road safety and driver licensing representatives of the roads and traffic authorities of each Australian jurisdiction. This input/comment was gained from a series of consultation briefings conducted by the program developers and/or ATSB with the road/traffic authorities in each state/territory capital during May and June 2004. The combined comments and suggestions of the expert panel and jurisdictional representatives have been incorporated into the Novice Driver Coaching Program.

## **What's in a Name? Why the Package is Called a Coaching Program**

Adoption of the title “coaching program” was deliberate and intended to indicate that the intent of the program is not one of traditional driving instruction but rather cooperative learning/development. The aim of the program is to assist novice drivers to develop as safe and responsible drivers by identifying areas for improvement in their driving behaviour on real roads and in real traffic. This differentiates this program from most others that have attempted to influence the development and behaviour of novice drivers (see Christie, 2001; Christie & Harrison, 2003)

An analogy from the sporting world would be the relationship between a tennis coach and a player who wished to improve their game. The tennis player can already play the game and knows the rules, but needs assistance to develop into a more skillful and competent player. The tennis coach does not attempt to retrain the player, but rather works with them to identify areas where they can improve and how this could be accomplished. Most of the player's improvement comes about via practice in the areas identified by the coach between face-to-face coaching sessions.

The Novice Driver Coaching Program therefore seeks to influence the development and behaviour of novice drivers through guidance interspaced with self-directed practice rather than the application of training input per se. This is consistent with the published literature that shows that training per se is unlikely to substitute for experience and practice in the development of almost any set of complex skills or behaviour (Harrison, 1999; Christie & Harrison, 2003).

## **Assumptions Inherent in the Development of Novice Driver Coaching Program**

In developing the Novice Driver Coaching Program, the consultants operated under the following assumptions/conditions about the curriculum/program, in that it should:

- Target novice-driver behaviours or characteristics that are known to be related to crash involvement. Targeting other behaviours or characteristics might influence behavioural outcomes or attitudes, but is less likely to have an effect on crash involvement.
- Target behaviours and characteristics that are able to be manipulated using an intervention based on sound education and training methods. Some characteristics that appear to be related to crash involvement – such as the personality of drivers – are not able to be changed using educational methods and would therefore make poor targets for the program.
- Target these behaviours or characteristics in a way that does not have negative consequences for safety. The cognitive and behavioural skills that assist in safe driving develop naturally for drivers, with the consequence that the likelihood of crash involvement is remarkably low for experienced drivers. This natural development of safe skills could conceivably be hindered by a driver training program.

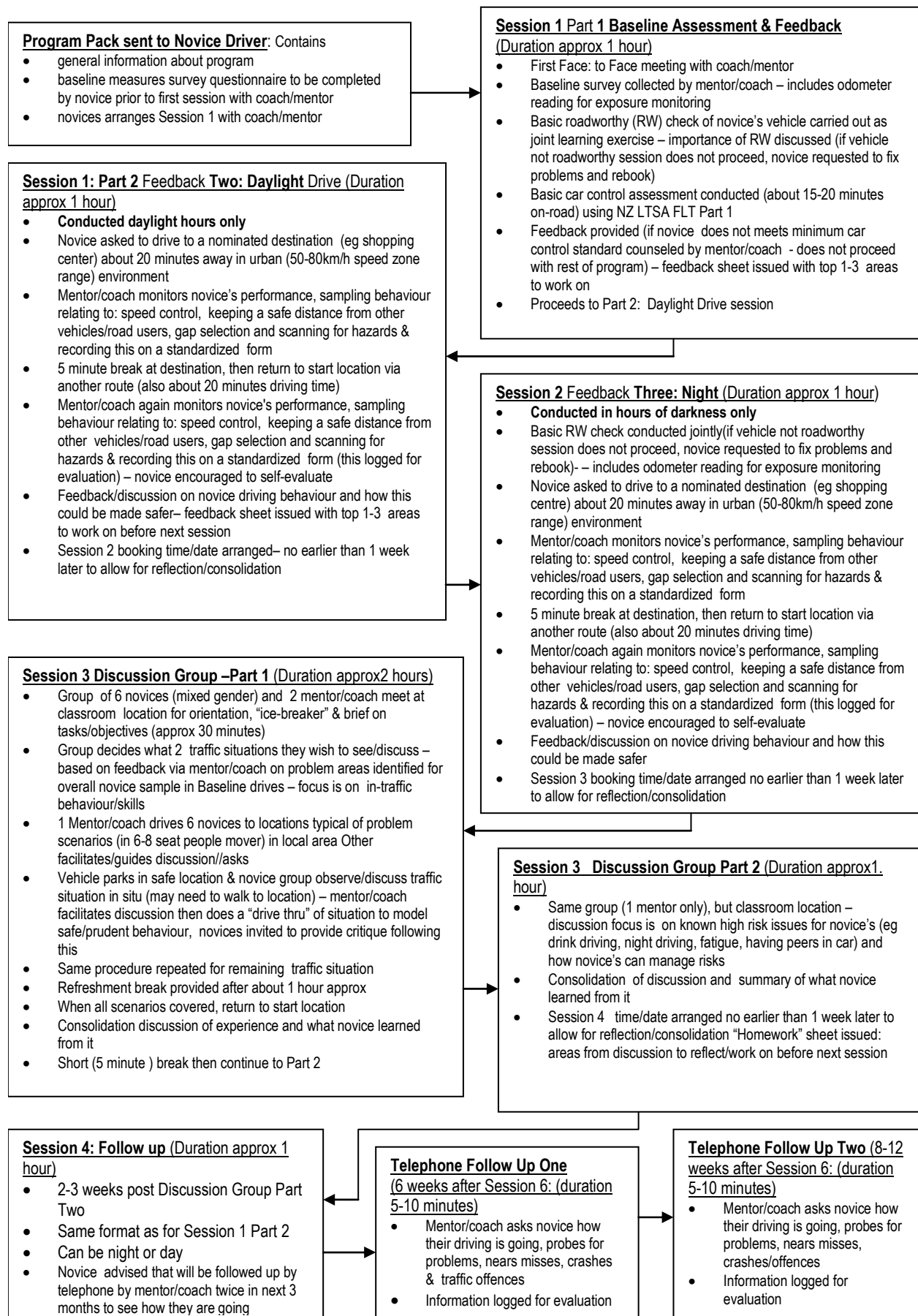
- Use educational or training methods that are known to have an effect on the target behaviours and characteristics, and be limited to methods of this type.
- Adopt an adult-learning approach to the development of novice driver participants – including the incorporation of coaching/mentoring.
- Target novice drivers with at least six months solo driving experience (to approximate the age/experience target of the Finnish Stage 2 program).
- Not include any off-road components as these would be expensive to provide and would be at odds with road safety/ driver licensing authority policy in most Australian jurisdictions and much of the published literature.
- Target higher order driving behaviour and not vehicle control per se.
- Not exceed a total of about 8 hours in duration (ie one-day program equivalent), though this could comprise a number of composite modules/sessions.
- Be capable of both behavioural and crash-based evaluation.
- If shown to be effective in reducing crashes/crash risk among Australian novice drivers, be deliverable within Australian driver licensing jurisdictions with the assistance of expert organisations such as TAFE.
- Not infringe the copyright and/or intellectual property of individuals or organisations.

The first three assumptions are important and are based on a theoretical discussion of novice driver education and training presented by Harrison (1999). These assumptions necessitated giving consideration to factors that are associated with crashes amongst novice drivers, and the way in which safer driving behaviours and characteristics develop in the context of normal driving experience.

The decision to target novices with at least six months solo driving experience was taken to parallel aspects of the Finnish Stage 2 program which targets novices with six to 24 months solo driving experience. It was also influenced by the research literature. For example, McKnight and McKnight (2003) report that experience has a broad effect across driving, and that the high crash rate during early solo driving relates to factors that depend on experience. In view of this, attempting to reduce the impact of these factors with an educational program in the early months of solo driving is unlikely to be successful. Overall, the choice of a minimum experience requirement reflects competing needs to introduce the program as soon as possible to influence novices in the period of highest risk (see Mayhew, Simpson & Pak, 2003) and to allow participants sufficient time to accrue solo driving experience that can be used as the basis for learning and discussion in the program.

It should be noted that insight-based approaches, while theoretically attractive, were not included in the proposed program. The literature suggests that insight-based programs relying on driving-range and related activities have been unsuccessful when assessed in relevant behavioural terms (eg. Nolen et al, 2002; Senserrick & Swinburne, 2001).

**FIGURE 1: OUTLINE OF NOVICE DRIVER COACHING PROGRAM**



Insight-based programs that teach limitations are likely to result in learning that mistakes when driving have only minor consequences (such as skidding without any further consequence).

### **Outline of Novice Driver Coaching Program**

An outline of the Novice Driver Coaching Program may be found at Figure 1 above. The flow chart at Figure 1 shows how the novice moves through the program from initial contact to final follow-up, post-program. A major feature of the model is modularisation to allow for reflection, consolidation of learning and self calibration (or re-calibration) of one's driving behaviour between contact sessions with one's mentor/coach and/or with a group of peers – considered to be beneficial in the development of novice drivers (Hattaka, Keskinen, Gregersen, Glad, & Hernetkoski, 2002). It is generally accepted that allowing some time between learning or training experiences increases the retention of learnt material (Adams, 1987).

The program structure includes the following components:

- An initial in-car assessment of basic driving and traffic skills based on the Land Transport Safety Authority (LTSA) New Zealand, Full Licence Test (FLT) – first part of Graduated Licensing System “exit” test developed by a team including the authors for LTSA (see: [www.ltsa.govt.nz](http://www.ltsa.govt.nz)).
- One-to-one feedback sessions with a coach in daytime and night-time driving conditions, each of one-hour's duration and each requiring that the participant drive to a given destination and then return to the starting point – parallels aspects of Finnish Stage 2 Program.
- Small-group discussion conducted in situ (eg in a vehicle in the vicinity of a traffic situation/location under discussion by the group) incorporating observation of potential problem situations and observation/discussion of drive-throughs by the coach - use of discussion techniques mimics the Finnish Stage 2 program and is consistent with Gregersen, Brehmer & Moren.'s (1996) positive findings in relation to discussion-group approaches.
- Small-group discussion conducted in a classroom situation.
- Follow-up one-to-one feedback session on-road/in-vehicle with a coach in either daytime or night-time driving conditions of one-hour's duration and requiring that the participant drive to a destination and then return to the starting point – targets journey related/purposeful driving and night driving which is known to be a particular risk for novice drivers (McKnight & Peck, 2002) – last opportunity for face-to- feedback.
- Follow-up telephone contact with participants – extends the potential influence of the program and aids data collection.

Contact, learning, reflection and follow-up are spread over a period of several months. However, the contact-time for novices is about seven hours across four face-to-face sessions and two telephone follow-ups - no more in total than the traditional “one-day” approach to novice driver training. This is considered to represent sound educational and developmental thinking and to enhance the

likelihood of behavioural change on the part of novice drivers exposed to the program.

The reader will also note that the collection of behavioural and related data is built-in to the program. This should facilitate the evaluation of the program in behavioural terms and help lay the foundation for subsequent crash-based evaluation.

## **Components of the Model Curriculum Package**

The authors, in conjunction with Darryl Johnston of DCS Consultants Pty Ltd, an experienced driver trainer, assessor and quality systems auditor, developed a curriculum package comprising five key documents that would allow ATSB to conduct a large-scale, crash-based trial of the program. The five documents are as follows (copies of these documents may be obtained from ATSB):

- *Novice Driver Coaching Program Guide* – sets out how the Program is to be conducted by a Coach and is the source document for the training of coaches.
- *Novice Driver Coaching Program: Coach Selection and Training Outline* – summarises the prerequisites for coach selection and outlines the training requirements/program for coaches.
- *Coaching Guide (Coaching Novice Drivers)* – a handbook for coaches covering how to coach/mentor specially written for this program which is used in coach training and as a reference for coaches conducting the program with novice drivers.
- *Novice Driver Coaching Program: Auditing Procedure* – guidelines for the auditing of the Program to ensure that it operates consistently and in accordance with the specified curriculum.
- *Evaluation Plan* – specifications for the proposed crash-based trialling and evaluation of the Novice Driver Coaching Program.

## **Evaluation Plan**

It was recommended to ATSB that the evaluation focus on the crash-effects of the program as the primary outcome measure, and that it make use of additional data-collection opportunities in the program to collect information about intermediate outcome measures such as behaviour changes.

The fundamental requirement is that the evaluation be conducted using a sound scientific method that enables a clear conclusion to be drawn about the causal relationship between participation in the program and crash involvement. This means that the evaluation must use an experimental method comparing a control group with a treatment or experimental group, and that assignment of participants to the two groups should be random, constrained only by the requirement that groups have about equal numbers.

The simplest evaluation design that meets these requirements is one in which one group of participants undertakes the novice driver program and the other group does nothing in relation to the program. Participants assigned to this no-treatment control group would provide some data (see below), but would otherwise go about their novice-driver period in the usual way. Some may undertake other driver training courses, but their only contact with the proposed program would be basic data collection.

This simple design would provide an assessment of the effect of participation in the program on the outcome measures compared to the current situation for novice drivers where there is no program of this type. It therefore provides an estimate of the effect of introducing the program that could be generalised across novice drivers assuming an effective sampling method is used and that the sample is representative of the broader population.

While there are some weaknesses in this design that would need to be considered when interpreting the results, it remains the best option for assessing the potential value of a new program. The key weakness is the possibility that any changes in the outcome measures could have been achieved through participation in any program, not the proposed program in particular. A design that uses a no-treatment control does not allow any conclusions to be drawn about the need for the specific program elements or components – it is possible that the same effects could result from involvement in some other program without the same content. The consistent evidence that driver training programs do not have positive safety consequences for novice drivers suggests that this may not be a substantial problem for this evaluation design (see Christie, 2001; Christie & Harrison, 2003). There is enough evidence that involvement in a driver training program does not have positive consequences to suggest that any “placebo” effect of program involvement is likely to be small.

### ***Crash Data Sources***

The authors envisaged that crash data should come from police-reported crash data obtained for participants (control and experimental group members) for at least a one-year period following participation in the program. Follow-up data-collection interviews conducted (by telephone) with treatment and control participants at four-month intervals should also be used to collect self-reported crash and other data. A single telephone interview could be used after twelve months, but recall of offence, crash, and near-miss data might be poor. While a minimum of twelve months follow-up should be used, a longer recording period would add to the statistical power of the evaluation. Collection of self-reported crash data in respect of crashes of all severity will be needed as police-reported crash data would be insufficient on its own given the sample size and time-frame envisaged.

### ***Other Data Sources***

Behavioural data would also be collected from treatment and control group participants by means of existing survey instruments such as the Driver Behaviour Questionnaire (DBQ; after Parker, Reason, Manstead & Stradling, 1995);



supplemented by special-to-project questionnaires. Observational data in respect of the treatment group would also be collected.

### ***Sampling and Sample Size Issues***

The authors recommended that the sample should be composed of young, novice drivers with at least 6 months experience as a solo driver, and who are under the age of 21 years at the time of joining the program. Participants should be paid for their involvement in the program (with an amount sufficiently motivating to ensure a high level of enrolment in the program), and will be divided randomly into the two, equal-sized groups.

Power calculations were conducted using several different methods (eg formulas for statistical power and Monte Carlo). The calculations assumed a treatment group and a single control group with about-equal numbers and two-tailed testing. Two tailed testing is essential to detect any negative program effects. Based on the various power calculations, it was recommended that a sample size of at least 6,000 participants in each of the two groups be included in the study, with a preference for a sample size of 7,000 in each. The authors also recommended that ATSB seek the expert advice of a consultant statistician to confirm the proposed sample size.

### ***Other Evaluation Issues***

To maximise independence and rigour in respect of the trial, the authors recommended that the evaluation method be fully planned in cooperation with representatives of government organisations with carriage of road safety in each jurisdiction, and in cooperation with a panel of selected international experts in the novice driver, driver education, and driver behaviour areas.

It was also recommended that analysis of the trial data should be undertaken by a number of independent evaluation experts in addition to the implementation/evaluation team. The full dataset could be provided to some international evaluation experts with encouragement to analyse it using appropriate methods to assess the effect of the program, with the results of these independent analyses being included in a published final report. This would aid transparency and credibility.

As noted above, the conduct of the trial program would be subject to auditing to ensure consistency and reliability. Data collection and analysis would, as far as possible, be automated in the interests of efficiency and effectiveness.

### **Conclusion**

The program developers consider that the Novice Driver Coaching Program outlined above represents a best-practice approach to the intent and content of a development program for novice drivers with at least six months solo driving experience. It is also considered that the program delivery envisaged is sound from

both an educational and behaviour modification perspective. The design also allows for the ready collection of evaluation/assessment information as part of a large-scale, crash-based evaluation of the program.

## References

Adams, J.A. (1987) Historical review and appraisal of research on the learning, retention, and transfer of human motor skills. *Psychological Bulletin*, 101, 41-74.

Bartl, G. (2000) (Ed) *DAN Report results of EU-Project: Description and Analysis of Post Licensing Measures for novice drivers*. Vienna: KfV (Austrian Road Safety Board).

Christie, R. (2001). *The Effectiveness of Driver Training as a Road Safety Measure: A review of the Literature*. Melbourne: RACV.

Christie, R & Harrison, W. (2003). *Driver Training and Education Programs of the Future*. Melbourne: RACV Ltd.

Gregersen, N.P., Brehmer, B., & Moren, B. (1996) Road safety improvement in large companies. an experimental comparison of different measures. *Accident Analysis and Prevention*, 28, 297-306

Harrison, W.A. (1999) *The Role of Experience in Learning to Drive: A Theoretical Discussion and an Investigation of the Experiences of Learner Drivers Over a Two-Year Period. Report 156*. Monash University Accident Research Centre.

Hattaka, M., Keskinen, E., Gregersen, N.P., Glad, A. & Hernetkoski, K. (2002) From control of the vehicle to personal self-control; broadening the perspectives to driver education. *Transportation Research Part F*.

Katila, A. et al (2000). Long-term effects of the Finnish driver training renewal of 1990. In G.Bartl (Ed) *DAN Report results of EU-Project: Description and Analysis of Post Licensing Measures for novice drivers*. Vienna: KfV (Austrian Road Safety Board), 59-68.

McKnight, A.J., & McKnight A.S. (2003) Young novice drivers: Careless or clueless. *Accident Analysis and Prevention*, 35, 921-925.

McKnight, A.J., & Peck, R.C. (2002). Graduated driver licensing: What works? *Injury Prevention*, 8, 32-38.

Mayhew, D.R., Simpson, H.M., & Pak, A. (2003) Changes in collision rates among novice drivers during the first months of driving. *Accident Analysis and Prevention*, 35, 683-691

Nolen, S., Engström, I., Folkesson, K., Jonsson, A., Meyer, B., & Nygard, B. (2002). *PILOT – Vidareutbildning av unga bilförare. Slutrapport*. Rapport 457. Linköping: VTI

Parker, D., Reason, J.T., Manstead, A.S.R., & Stradling, S.G. (1995). Driving errors, driving violations and accident involvement, *Ergonomics*, 38(5), 1036-1048.

Senserrick, T.M., & Swinburne, G.C. (2001). *Evaluation of an insight driver-training program for young drivers* Report 186. Clayton, Vic.: Monash University.