

Stefan Siegrist (ed.) (1999)

Driver Training, Testing and Licensing - towards theory-based management of young drivers' injury risk in road traffic
Results of EU-Project GADGET, Work Package 3

Summary

GADGET is a research task within the 4th framework package of EU DG VII. The title of the task was as follows:

“Assessment of changes in driver behaviour resulting from the introduction of in-vehicle safety devices, visual modifications to the road environment, educational, training and legal measures, and safety campaigns.”

The wide range of safety measures addressed in the task description made it necessary to group the measures according to the principles they are based on. Measures can be classified according to a vast number of characteristics. Engineering, education and enforcement (“the three E’s”) is the most common way to distinguish safety efforts. The GADGET consortium divided the “three E’s” once more and decided to structure the work in five different work packages.

Table V.1:
The three “E’s” and the work-package structure of GADGET:

ENGINEERING		EDUCATION		ENFORCEMENT
WP1	WP2	WP3	WP4	WP5
Telematics (in-car safety devices)	Modifications to the road environment	Education and training (various training, testing and licensing programmes)	Safety campaigns	Legal measures (including enforcement)

This report is on Work Package 3. Other work-package reports exist (*WP 2*: Sagberg, Hakkert, Larsen, Leden, Schmotzer & Wouters, 1999; *WP 4*: Delhomme, Vaa, Meyer, Harland, Goldenbeld, Jarmark, Christie & Rehnova, 1999; *WP 5*: Mäkinen, Jayet & Zaidel, 1999) as well as an overall GADGET report (Christ, Delhomme, Kaba, Mäkinen, Sagberg, Schulze & Siegrist, 1999, report for the attention of EU DG VII).

Road crashes are the major public health problem for young adults (see Ch. I, p. 3)

Road crashes are the leading cause of external road transport costs. Road fatalities are also the main cause of deaths in the EU in the age group 15 to 24. Compared to other causes of death, such as cancer and cardiovascular disease, road crashes produce a much higher average number of potential years of life lost. Every year in the EU about 15,000 young people die due to a road accident. The road fatality rate per 100,000 inhabitants is twice as high in this age group as in the case of older drivers.

In order to improve the health situation in this age group, or even to attain the objective of ‘vision zero’ (no severe injuries or fatalities due to road accidents), improvement of driver education is an important element.

Improvements in this field necessitate new concepts and testing procedures but also a high and uniform level of training for driving instructors. Improved driver-training and licensing systems also require more money, although there are some ideas as to how costs can be kept down. For this reason the realization of the best practice presented in this report also depends on the willingness of politicians to improve the health situation of young European citizens.

The aim of Work Package 3 was to define best practice on the basis of a theoretical framework, available studies and expert judgements

The objective was to assess different models of driver education, training and testing with respect to their safety benefit and produce recommendations for best practice. This was realized by

- summarizing the relevant theoretical background
- presenting the relevant aims of driver education, training and testing according to the conceptual hierarchical framework
- assessing the influence on driver behaviour of main programmes and methods
- drawing conclusions for best practice in driver training and testing

It was not possible to apply scientific meta-analysis for two reasons. First, only very few controlled studies exist; second, it was the intention also to assess new ideas that are not in practice yet. The assessment of existing or planned measures was therefore based on expert opinions.

Driver training must be based on theoretical assumption and on concrete objectives and methods for best practice to be derived (see Ch. II, p. 13)

Guidelines for driver education can be derived from traffic-psychological theories and recent theoretical approaches in the psychology of learning and education.

The basic assumption is that driver behaviour is organized on four hierarchical levels. The idea in a hierarchical approach is that both failures and successes on higher levels affect demands on lower levels. The training curriculum should cover all levels in the hierarchy. The training process should start with the acquisition of the necessary basic vehicle-maneuvring automatism, and then progress to the mastery of traffic situations. Seeking to improve driver education by simply increasing the amount of training will only have limited success.

Explicit and well-designed methods for supporting the process of dealing with the two highest levels in the hierarchy are also needed. These higher levels are not accessible with teacher-centred methods like lecturing, or a longer training period. Active learning methods are needed. Driver training should be open to the view of driver behaviour as a multi-level task. Without this, the driver will not be able to learn from experience about risks connected with motives and goals at the highest hierarchical levels. Practising self-evaluative and meta-cognitive skills should therefore be included in training programmes as this offers a possibility for developing post-training expertise and for reaching and modifying motives and objectives at the highest level. There are three main driver-training subject categories, each containing subgoals, which can be placed on the four hierarchical levels of driver behaviour.

The theoretical framework and the referring structure of driver-training subjects is summarized in Table V.2.

This theoretical framework was developed in order to have a concrete criterion for the main assessment. This main criterion is safety resulting from of a change in behaviour. Besides safety as the main quality criterion, measures were also judged as to their efficiency, as well as their impact on the environment and social equality. This led to a grid of questions that had to be answered for all measures. The expert opinions were based on answers to the following four groups of questions:

- Assessment of the goals that are addressed by the measure in question
- Assessment of the pedagogic methods and principles that are in use
- Assessment of the correspondence between the training programme as proposed by programme designers and practice
- Assessment of the impact on safety-related behaviour and additional criteria (economy, environment, social equality)

Table V.2:

Hierarchical levels of behaviour and referring structure of driver-training subjects

	Essential curriculum		
	Knowledge and skills	Risk-increasing factors	Self- evaluation
Goals for life and skills for living (general)	Knowledge about/control over how life-goals and personal tendencies affect driving behaviour <ul style="list-style-type: none"> - lifestyle/life situation - peer group norms - motives - self-control, other characteristics - personal values 	Risky tendencies <ul style="list-style-type: none"> - acceptance of risks - self-enhancement through driving - high level of sensation seeking - complying with social pressure - use of alcohol and drugs - values, attitudes towards society 	Self-evaluation/ awareness of <ul style="list-style-type: none"> - personal skills for impulse control - risky tendencies - safety-negative motives - personal risky habits
	etc.	etc.	etc.
Driving goals and context (journey-related)	Knowledge and skills concerning <ul style="list-style-type: none"> - effects of journey goals on driving - planning and choosing routes - evaluation of requested driving time - effects of social pressure inside the car - evaluation of necessity of the journey 	Risks connected with <ul style="list-style-type: none"> - driver's condition (mood, BAC, etc.) - purpose of driving - driving environment (rural/urban) - social context and company - additional motives (competitive, etc.) 	Self-evaluation/ awareness of <ul style="list-style-type: none"> - personal planning skills - typical driving goals - typical risky driving motives
	etc.	etc.	etc.
Mastery of traffic situations	Knowledge and skills concerning <ul style="list-style-type: none"> - traffic regulations - observation/selection of signals - anticipation of the development of situations - speed adjustment - communication - driving path - driving order - distance to others/safety margins 	Risks caused by <ul style="list-style-type: none"> - wrong expectations - risk-increasing driving style (e.g. aggressive) - unsuitable speed adjustment - vulnerable road-users - not obeying regulations/ unpredictable behaviour - information overload - difficult conditions (darkness, etc.) - insufficient automatism 	Self-evaluation/ awareness of <ul style="list-style-type: none"> - strong and weak points of basic traffic skills - personal driving style - personal safety margins - strong and weak points for hazard situations - realistic self-evaluation

		or skills	
	etc.	etc.	etc.
Vehicle manoeuvring	Knowledge and skills concerning - control of direction and position - tyre grip and friction - vehicle properties - physical phenomena	Risks connected with - insufficient automatism or skills - unsuitable speed adjustment - difficult conditions (low friction, etc.)	Awareness of - strong and weak points of basic manoeuvring skills - strong and weak points of skills for hazard situations realistic self-evaluation
	etc.	etc.	etc.

Driver training is more effective if it is part of a well-designed licensing system and if more emphasis is given to self-evaluation and socio-psychological influences on driving (see Ch. III.1, p. 49)

The overall licensing systems that are analysed range from pre-test education and training to post-test measures as long as they are parts of a specified licensing system.

There are many descriptions of overall systems in the relevant literature but few evaluations. There are also very few systems where the curricula, educational content or goals have been described. Most presentations cover the administrative frameworks of the systems, such as age limits, restrictions, number of hours of training, time spent in different phases, etc. As the scope of the study does not permit any new empirical studies, the intention has been to take the best from existing literature. However, programmes are currently being developed in several countries in which new goals, training methods and structural changes are discussed. To some extent this development process was covered.

Each country has its own licensing system. No country is identical to another. It is thus impossible to discuss each system individually. The systems need to be classified. The following systems have been chosen for a detailed presentation and assessment on the basis of the theoretical framework:

- Single-phase systems (Denmark, UK, USA, DeKalb County)
- Single-phase system with probationary licence (Sweden, Germany)
- Two-phase systems with probationary licence (Luxemburg)
- two-phase system with provisional licence (Finland)
- Graduated licensing system (New Zealand, Victoria, New South Wales, Ontario)

A general conclusion that can be drawn from the review is that the systems that have shown safety-increasing effects are systems that have not only increased the amount of formal education and training, but introduced other components, such as graduated licensing, increased experience through lay instruction or risk-awareness training.

The young novice driver's safety can be addressed in two ways. One, which has been dominating in research up to now, is to reduce the factors that increase accident involvement. The other, which has occasionally been discussed, is to increase the influence of factors that define safe drivers. Both approaches are probably needed, but in order to adopt both there is a need to define safe driving. What is it that makes the safe driver safe and what do we mean by safe? There is still much research to be done in this field, but we also know a lot from earlier research. Translated into goals for driver education and training, the grid presented in Chapter II defines two dimensions that should be considered. One dimension defines the hierarchical levels of driver behaviour and the other defines the essential curriculum. The efforts of programme designers and decision makers should be directed

at covering as much of the grid as possible. From today's traditional education, which focuses on the lower left corner of the grid, future education should aim to include the upper right corner. In terms of actual goals, driver education should expand from the knowledge and skills of vehicle manoeuvring and the mastery of traffic situations to include more about driving goals and context as well as about goals for life, risk awareness and self-evaluation. A modified combination of the graduated licensing system (GLS) framework and a specified education and training programme with subject matter that is specified by the dimensions of the grid would seem to be a promising direction of development.

Another general impression was that the environmentally-oriented use of the car was not especially emphasized in training systems. This is something that needs to be taken more seriously. It should be considered as a problem if a driver-training system aimed at making young people start practising driving already at the age of 16 encourages them to choose a private car as the main means of transport. This should be avoided. There may be role conflict in driver instruction. Driving schools depend on the fact that people need licences. On the other hand, they should be educating people to refrain from driving unless absolutely necessary.

Conclusions / Recommendations:

- Graduated licensing systems can be recommended because in several cases evaluations have shown a reduction in accident involvement in those countries where the licensing age is below 18 years and where safety problems are especially serious.
- There is also some evidence in Europe (Germany, Austria) that probationary licence systems offer some safety benefit.
- It makes sense to increase 'protected experience'.
- No system covers the whole evaluation grid, which indicates that there is considerable potential for developing overall systems.
- If the social and psychological context as well as behavioural self-analysis methods are covered in the training programme, many of the well-known accident-related factors associated with young novice drivers may be dealt with.
- A combination of the ideas contained in a graduated system and educational subject matter aimed at the upper right corner of the grid would seem promising in safety terms.
- Social equality problems cannot be significantly improved by systems based mainly on private instruction. Selection effects may cause problems.

School-based safety education may improve the impact of driver training, and school-based driver training makes it possible to extend the training aims and methods (see Ch. III.2, p. 89)

Two kinds of school-based approaches that aim to improve the driving behaviour of novice drivers are possible: school-based pre-training education and school-based driver training. In both cases it is possible to use the traditional curriculum and training methods but also to benefit from the special environment by introducing new subjects and methods.

School-based pre-training education can be understood as an instrument for preparing young people for their role as 'mobility consumers', especially as car drivers. This strategy is aimed at those who are still just too young to take part in driver training. In Europe it is usually between the ages of 15 and 17 that traffic education is no longer offered and driver training has not yet begun.

Although there is a lack of empirical experience, there are arguments in favour of follow-up traffic education up to the age of 18. Road safety education at school is more likely to have an impact on subsequent road user behaviour if programmes refer to the whole range of subjects shown in the grid. Understanding the complexity and social dimension of traffic as well as one's own behavioural tendencies, and developing self-perception skills may have a positive impact on exposure and driving style. This impact is hardly likely to be a direct one. According to expert opinions, the advantage of proper traffic education at school for subsequent car driving behaviour is that it enables and enhances the effectiveness of later driver training.

In *school-based driver training*, the training itself, and possibly also the testing, is integrated in the school system, which means that external driving instructors only make a complementary contribution by teaching mainly the practical elements of driving. Recent thinking suggests that better use should be made of the teachers' pedagogic experience as well as of the opportunities provided by the school environment in order to apply new methods and to work in existing peer groups. In such a case, the aims are to make the learning process more detailed, to stress the social dimension of driving and to broaden the training objectives.

The assessment of existing and planned measures has shown that school-based driver training is an interesting approach that offers new options. However, several possible methods must be carefully separated and their effects discussed. One main criterion is the choice of methods and curriculum. If school offers no more than a platform for ordinary driver training, focusing mainly on knowledge of the traffic regulations and manoeuvring a vehicle, a safety benefit can hardly be expected. There is also the problem that school-based training can act as an incentive to start driving earlier. Since exposure is clearly an important condition for a car accident, school-based measures should seek to exclude such effects. This would be possible by expanding the curriculum and methods, which is easier to implement than in conventional driving schools. It is also possible to learn in existing groups and to apply the pedagogic repertoire of the teacher.

Conclusions / Recommendations:

- Follow-up traffic education probably improves the effectiveness of subsequent driver training.
- Be aware of the possible negative effects of an increase in mileage and starting to drive earlier.
- Simply increasing the amount of traditional training or bringing it into school does not improve safety. It is necessary to extend the subject matter.
- The school environment offers unique opportunities to include new subjects and methods in driver training (mobility training rather than driver training).
- Covering the psychological and social dimensions of driving, and teaching self-evaluation skills would be possible in the school setting.
- Interventions should always be accompanied by evaluation studies, if possible case control studies.

The main aim of driver testing is the improvement of the preceding phase of training and practice, hence the desirability of including higher-order skills, such as self-evaluation (see Ch. III.3, p. 102)

The main objective of driving tests is concerned with road safety. Driving tests attempt to meet the safety objective by means of driver selection - which means that those who lack the required competence to drive in traffic are not permitted to enter the system. An additional - and probably even more important - function of the driving test is to influence the training and practice undertaken by learner drivers.

Depending on the design of the testing, training and licensing system, a driving test may influence driver training in several ways:

- The test syllabus and test standards directly influence the curriculum, standards and amount of training and practice;
- The test may constitute important training in itself for both passing and failing candidates;
- Specifically, failed candidates are returned for more training and practice, and the test result indicates the areas on which this training and practice needs to concentrate.

The reliability of a test is its ability to produce consistent results; a test is considered to be reliable if it would produce substantially the same results when repeated under identical circumstances. In general, the validity of a test is the extent to which it measures what it purports to measure. In the case of a driving test, this might be defined in terms of competence and of the likelihood of being a safe driver. However, there is a sense in which a test may be judged to be valid if it meets its objectives. Thus a driving test would have good 'consequential' validity if, when introduced into a testing/training/licensing system, it influenced the amount and quality of training and practice un-

undertaken by learner drivers so as to achieve acceptable levels of safety and competence.

It is important to bear this in mind, since there are special characteristics of driving tests that mean they may have low reliability and predictive validity for candidates who actually come forward for test but may still induce good training and practice and thus have high consequential validity.

To judge whether current driving tests, and possible improvements to them, are likely to achieve this goal, heavy reliance on the validity of the curriculum is necessary - covering both the subject matter and quality of the test, and the training and practice that it is likely to induce. The hierarchical model of driver-training goals presented in Chapter II of this report presents a theoretical framework that is ideally suited for this purpose.

In most European countries the driving test is focused on skills regarding basic vehicle manoeuvring and mastery of different traffic situations. In some countries new tests are being developed or used that attempt to measure higher-order cognitive functions, mainly hazard perception. Other skills, such as reliable self-evaluation of driving behaviour, are very seldom referred to in driving tests. However, there is experience in Finland that self-evaluation can be successfully implemented in driver testing. Although testing reliability will perhaps be even lower in higher-order skills, such tests will have a beneficial effect on the driver-training process. Adding more safety-relevant aspects to the failure criterion might also help to screen out drivers with a high accident liability and to improve training in these areas.

Additional conclusions from the evaluation of testing procedures are:

1. The short descriptive overview of driver testing in Europe already points to some practical limitations to high-quality testing in some countries: for example, relatively short testing time, short time for feedback, emphasis on pure knowledge testing, workload of examiners.
2. The theoretical assessments of driver testing in the Netherlands and Finland show that driver testing only covers part of the possible range of driver-training goals.
3. There is good potential for improving current driver testing in Europe. Specific suggestions can be given as to how to improve the testing itself. It should, however, be borne in mind that because driver-testing and licensing systems vary so much from country to country, and because many possible improvements to testing have not been evaluated, it is not possible to give specific recommendations for best practice that will be suitable for every country.

Conclusions / Recommendations:

- Cover a wide range of driving conditions.
- Give good post-test feedback to candidates and instructors.
- Improve coverage of higher-order skills, such as hazard perception and self-evaluation.
- Make use of minor, but nevertheless potentially risky, faults as a failure criterion.
- Attempt to find ways of using examiners' assessments of overall performance, driving style and future-accident liability as failure criteria.
- Attempt to find ways of including attitude-related items that predict future unsupervised driving behaviour and accidents.
- Change the training and licensing system outside the test so as to improve the training and practice accumulated by learner drivers and to exert a continuing supervisory influence during early solo driving.

Driver Improvement has some positive impact on the re-offending rates of delinquent drivers and also offers appropriate intervention strategies for ordinary driver training (see Ch. III.4, p. 139)

Driver Improvement (DI) is based on the observation of the limited efficiency of a purely punitive approach to illegal and dangerous driving behaviour. DI measures are designed to complement the more punitive consequences of illegal behaviour, including warning letters, interviews, actions concerning the driving licence (suspension, withdrawal, probation), non-punitive approaches (re-

wards, incentives and reinforcements) and programmes for groups.

DI programmes for young delinquent drivers represent a combination of educational, psychological interventional, punitive and social approaches. They are either integrated in a probationary licensing or point system, as in Germany, Austria and France or, as in some US States, in a single post-test measure.

The philosophy common to all the programmes is the following: the causes of non-compliance with traffic regulations are different for young drivers and older, more experienced drivers. Specific causes relate to their stage of life and the associated psycho-social aspects, their inexperience and to some extent also to specific physiological aspects. It is mainly their risk-taking behaviour (as a by-product of basic motivation) as well as their general, BAC-related high risk level that are specific to young drivers. DI programmes for young drivers aim to match the intervention to the problem.

DI measures producing convincing results have been evaluated, although such results do not prove a direct link between DI measures and road safety. However, DI measures seem to have a positive effect on compliance with traffic regulations. In the United States several evaluation studies have been published, going back as far as 1967. A review of courses for traffic offenders (but not specifically for young offenders) concluded that those which addressed attitude and attempted to alter motivation were more effective in changing behaviour than were courses aimed primarily at developing knowledge. European evaluation studies almost exclusively refer to attitude and lifestyle-oriented interventions that apply an inventory of psychological and psychotherapeutic tools, because only very few DI courses exist where knowledge or manoeuvring skills are the main element of the measure.

The following conclusions can be drawn with respect to different evaluation studies as well as to the assessment of three selected models: Until now, the change in delinquent behaviour and attitudes resulting from DI measures has not led to clear and unanimous conclusions within the framework of an epidemiological assessment model (effect on collisions). However, these changes have been significant in statistics concerning the education model (effect on knowledge and attitudes) and the health model (effect on behaviour patterns, such as alcohol consumption).

Although DI group programmes represent a considerable effort, and target quite a small group of road users, there is no alternative to this complementary and at least partially effective measure. DI programmes have another positive effect: driver-training measures can benefit from DI measures.

DI interventions start from problem definition that refers to psychological and social behaviour determinants. Vehicle-manoevring skills and mastery of traffic situations are not covered on these courses. On the other hand, the role of a driver's personal situation in life and the social context are judged as essential. For this reason, basic motivation and social influence are of key importance when defining the course curriculum. DI programmes address the relevant causes of unsafe behaviour and they have developed methods that go beyond ordinary driver training.

Conclusions / Recommendations:

- DI programmes should be part of every driver-training system.
- Make sure that your DI programmes meet high quality standards (for example, with respect to the psychological education of instructors).
- In order to be effective in influencing behaviour, driver training also has to cover matters and intervention procedures that are referred to in DI programmes.

The effectiveness of voluntary post-test training courses suffers from a pronounced self-selection effect, but can be improved if incentives are offered and if the subject matter and methods of the courses also cover higher-order and self-perception skills (see Ch. III.5, p. 166)

In several European countries car drivers take advanced driving courses after they have obtained their driving licence. We define advanced driver training as voluntary training for licensed car drivers aimed at teaching or improving cognitive, perceptual or vehicle-handling skills in order to establish more efficient, more safe or more economic (environmentally-oriented) driving behaviour.

Some evidence concerning the effectiveness of voluntary driver courses is available. The conclusions from reviewing the relevant literature are the following:

1. Virtually no studies have been found concerning the effects of advanced on-road training on drivers' accident involvement.
2. In some studies, indications have been found that instruction on a closed circuit can lead to improvements in attitudes and behaviour and reduction of accident risk. In other studies of advanced driving courses where the emphasis was on the improvement of skills, the negative effects of accident involvement were found, suggesting that one-sided reliance on car-craft skills may prove to be counter-productive.
3. The description of the programme being evaluated in the studies is often very scanty. The description of the attitudes and skills which the programme is trying to improve is often inadequate.
4. Research into the effects of such training courses on the accident risk are subject to methodological pitfalls. Reliable conclusions are therefore almost impossible.
5. Swedish research has shown that effects on accident involvement can also be achieved by other means, such as a group discussion or a bonus system.

Conclusions / Recommendations:

- Improve the quality of the programme and the instructor (for example, the course contents and methods should also cover higher-order and self-perception skills).
- Adapt the course to the target group.
- Make use of the group process (for example, use methods such as group discussion).
- Be aware that the safety potential of voluntary driving courses may be diminished by a process of self-selection.

We can expect driver licensing systems to be effective and cost-efficient

There was insufficient data to be able to make conclusive statements within this project about the cost-efficiency of driver-training and licensing systems.

Nevertheless, a conclusion that can be made is that, even though several kind of methods connected with driver education and driver testing have been developed, the willingness to employ them is not great. In several countries and also in the discussions within the group working on this report, the costs have been a major concern in the evaluation of systems. Also when making suggestions and ideas for developing new systems. The problem is a kind of paradox. The educational system should produce safe drivers with reasonable experience before independent driving begins, and certain things should be done after licensing in order to improve the attained skill level further or to guide problematic drivers to follow the system's requirements. At the same time, however, the system should be free of charge. The notion that drivers could be influenced at no cost is simply not feasible. Furthermore, educational methods, especially, are expected to be free of charge. Investment in technology is considered to be a proper policy (for example, anti-locking brake systems, even though their positive effects on safety are debatable). Well-designed educational methods are not harmful, and are sometimes even profitable. Furthermore, they can also be commercial products. As in any product, the price of training varies according to its quality. Training based on lecturing large groups is cheap, but high-quality personal training aimed at increasing personal awareness of a driver's own typical behaviour in traffic, for example, will inevitably generate cost. Good personally-adapted training is not cheap.

The underlying philosophy therefore seems to be that driver education is a private matter, despite the fact that novice drivers' accidents are a major public health problem.

The objective of driver education is to produce safe drivers. If it can be shown that this objective is achieved by 'better' driver education, then the effort is worthwhile. However, it is very difficult to demonstrate the effectiveness of driver education. This requires a thorough evaluation of 'best practice training systems'. It is a fact that in all countries in which the standard of safety can be considered to be good, there is a system for controlling driver training by established testing systems, by direct control of the training system, or both.

The proposal is:

- To use expert information (such as this report) to create and implement improved driver education/testing systems
- To organize and finance a thorough evaluation.
- To make a cost-effectiveness assessment.

In order to improve driver training it is necessary to do three things:

- 1) permanently monitor the driver-training programmes and licensing systems**
- 2) carefully observe the development of specific parameters in society and the economy**
- 3) draw conclusions from other areas relevant to road safety (such as telematics)**

(see Ch. IV, p. 185)

No country has a good permanent system for monitoring the results of driver training. Whenever a new element is incorporated in driver training, evaluation studies have to start from zero and resources are lost. A method should be established to continuously evaluate the training system and its product. Parts of this method could be based on material obtained from driver testing. In order to fulfil this task, it is necessary to **establish a European working group for driver-training evaluation.**

Such a permanent group would initially establish standards for monitoring and evaluating driver licensing systems before starting to collect and interpret national data. This work should be coordinated with one from other European evaluation groups in the public health area. In this way it would be possible to have a permanent and up-to-date best-practice target.

Driver training must also respond to changes in basic social and economic conditions. For example, better perception of environmental problems reflects a change in a societal value system. This would present new requirements and opportunities - also for driver training. Although it is difficult to demonstrate a clear scenario of general development, and especially of the development of European traffic systems, it is certain that conditions will change over the next 30 years and that international harmonization (also of driver-training guidelines) will bring more efficient solutions. Changes in the following fields also affect driving opportunities, the driving task and thus also driver training:

- political and economic development (European integration and harmonization)
- changes in society (such as shifts in age and income groups)
- European tendencies in transport (for example, in combining different means of transport)
- changes in the environment (such as an increase in temperature and less stable weather conditions)
- changes in infrastructure and technical development

In addition, trends in other safety measures need to be monitored and discussed in terms of their consequences for driver training. For this reason, the results produced by other GADGET working parties (telematics, visual modification of road environment, safety campaigns, legal measures and enforcement) were analysed. Table V.3 summarizes how these road safety measures are inter-related.

Table V.3:
How the five GADGET project work packages are interrelated

	Best practice in driver training necessitates the following changes in these fields	Best practice in these fields necessitates the following changes in driver training
Telematics	<p>No direct link.</p> <p>(Of course, general claims are mainly valid for young drivers: systems should control routine behaviour and provide the driver with enough feedback.)</p>	<p>In-car devices will change the character of the driving task.</p> <p>Driver training will therefore continue to be necessary. However, its curriculum and methods must change from time to time in response to technical progress. Learning to learn will become more important: driver training must involve learning from the driver's own experience, using active learning methods.</p>
Visual modification of road environment	<p>No direct link.</p> <p>(Guidelines for best practice in road environment design should generally allow for the possibilities, limitations and behaviour patterns of novice drivers.)</p>	<p>No implications.</p> <p>(Best practice in road design is self-explanatory)</p>
Safety campaigns	<p>Subject matter, methods and organization of driver licensing systems will become more and more complex. It will therefore be necessary to apply marketing techniques. In order to influence the motivation of learner drivers to comply, safety campaigns aimed at the situation and wishes of young drivers will therefore be necessary.</p>	<p>No direct link.</p> <p>(Campaigns must be aimed at young people's situations and needs, be based on empirical knowledge and theoretical assumptions, involve pre-testing and be linked to enforcement issues.)</p>
Enforcement	<p>Driver licensing systems are increasingly characterized by a combination of education and enforcement strategies (graduated licensing systems, combination of probationary and provisional systems). It is therefore necessary to design enforcement strategies for novice drivers.</p>	<p>No direct link.</p> <p>Enforcement activities must be aimed at young drivers' behaviour habits (time and place of visible enforcement and detection, time and place of information about enforcement).</p>

References

Christ, R., Delhomme, P., Kaba, A., Mäkinen, T., Sagberg, F., Schulze, H. & Siegrist, S. (1999). The Gadget Report. Report for the attention of EU DG VII.

Delhomme, P., Vaa, T., Meyer, T., Harland, G., Goldenbeld, C., Jarmark, S., Christie, N. & Rehnova, V. (1999). Evaluated road safety media campaigns: An overview of 265 evaluated campaigns and

some meta-analysis on accidents. Institut National de la Recherche sur les Transports et leur Sécurité (INRETS), Arceuil Cedex.

Mäkinen, T., Jayet, M.C. & Zaidel, D. (1999). Legal Measures and Enforcement. Report for the attention of EU DG VII.

Sagberg, F., Hakkert, A.S., Larsen, L., Leden, L., Schmotzer, Chr. & Wouters, P.I.J. (1999). Visual modification of the road environment. TÖI Working Report 1137. Institute of Transport Economics, Oslo.