SWOV Fact sheet

Driver Training in Steps (DTS)

Summary
For some years now, it has been possible in the Netherlands to follow a Driver Training in Steps (DTS) as well as the regular driver training. The DTS is a structured training method with clear training objectives which are categorized in four modules. Although the DTS is considerably better than the traditional driver training from a didactic point of view, it is as yet difficult to establish its extra road safety value because there have not been any large scale crash studies. There should also be a note of caution regarding the effect of self-selection when choosing a driving course, and regarding the very slight differences with the regular course at the behavioural level. If the DTS were to be combined with a graduated driving licence, i.e. a learning period in which novice drivers are allowed to participate in traffic in phases, it could have a positive road safety effect for novice drivers.

Background and content
To obtain their driving licence, learner drivers in the Netherlands take driving lessons of an hour each, once or twice a week, until the instructor finds them skilled enough to pass the driving test. The period in which the driving lessons are taken can have a duration of several months to longer than a year. This traditional driving course does not usually have a formal curriculum or a fixed method. For some years now a driver training course is being offered that does have a clear structure: it is called the Driver Training in Steps (DTS). This fact sheet discusses this training method and will go into its road safety effect.

What is the DTS?
The DTS is meant to train learners in finding a solution for every problem they may encounter in traffic independently. The DTS has clear training objectives which are clustered in four modules that range from simple to difficult:
Module 1: vehicle operation and vehicle control;
Module 2: mastering simple vehicle manoeuvres and traffic situations;
Module 3: complex vehicle operation, and control of complex traffic manoeuvres and situations;
Module 4: safe and responsible traffic participation.

A new module may only be started when a test has shown that the learner has mastered the training objectives of the previous module. Module 4 is partly taught on a traffic training track let the learner drivers experience the lack of vehicle control when the car, for example, goes into a skid. The lessons on the training track are not compulsory. Modules 1 and 2 are tested together by the driving instructor in a partial test. Module 3, which is also a partial test, is examined by an examinor of the Dutch Driving Test Organisation. Passing this test earns an exemption of the special skills being tested in the regular driving exam. The final test is the regular driving exam. The lessons apply what are known as scripts. These scripts contain the crux of the procedure to deal with certain traffic tasks. For example, the script for normal viewing behaviour is "Look two hundred metres ahead, don't look at one point only, look in the inside mirror, look in front of the car, look in the outside mirror/mirrors". When learning a traffic task, the learner begins with applying the script under simple conditions. The learner then has to gradually learn how to use these scripts in more complicated circumstances. What is different from the ordinary driver training is that the progress of the DTS learners is systematically tested by asking them to carry out certain specific tasks which are registered in a course file. Not all driving instructors may use the DTS method; a certified instructor has to follow an additional six day course. DTS instructors have to follow an application course every year to remain a certified instructor.

The DTS is sometimes confused with the *graduated driving licence*. The graduated driving licence however, refers to a phased entry to the road as a driver. (see the SWOV Fact sheet *Graduated driving licence*). The DTS only refers to the official training. It is a curriculum and a method for driving lessons which are taught by a driving instructor. Within the DTS it is possible to follow a compact course of several days; this is unthinkable in the graduated driving licence.

How can we determine the safety value of a driver training course?
The DTS aims to be more than an efficient method of obtaining a driving licence. It is also about safe and responsible traffic participation for novice motorists, which should support lowering their high crash rate (see the SWOV Fact sheet *Young novice drivers*). The safety value of a driving course can be measured in four different ways:

Course contents
Regarding course contents, didactics and learning objectives can be investigated: do they guarantuee good *transfer* and *retention*? Is the didactics such that learners may be expected to use the things they have learned in practice (transfer) in the period after the driving exam when they drive without being accompanied by an instructor, and that they do not forget what has been learned (retention)?

Pass rate
The pass rate is only an indication of the safety value of a driving course if the driving test is *valid*, i.e. if there is a strong relation between the scores of the driving test and the crash rate in the first years after passing the test. The validity of a driving test is difficult to determine because those who fail the test are not permitted on the road.

Crash involvement
If, after having obtained their driving licence, those who followed course X are less often involved in crashes than those who followed course Y, we can conclude that the safety value of course X is higher than that of course Y. However, studies of crash involvement are rare. This is not surprising because an evaluation study requires very many subjects, i.e. thousands of novice drivers. After all, crashes are rare events which are, to a large extent, determined by chance. In other words, crash involvement research is difficult to perform and is very time consuming.

Safe behaviour
It is also possible to investigate whether, after getting their driving licence, novice drivers who followed course X behave better or worse in traffic than those who followed course Y. Such a study requires a clear relation between certain behaviour and crash rate. A great deal of research into this has been carried out and clear relations have been identified. The advantage of behavioural research is that it requires much smaller groups than crash involvement research.

Self-selection problem
A problem with all these studies into the road safety effects of a particular driver training is the fact that learner drivers themselves choose a certain driver training type. If, for example, only learner drivers with a high safety awareness were to choose a DTS, then any differences in pass rate, behaviour, or crash involvement are not only explained by having followed a DTS but also by their personal characteristics. This phenomenon is known as self-selection. To exclude this phenomenon, learner drivers in an evaluation study would need to be randomly allocated to a DTS or to a traditional driver training. As the Netherlands has freedom of education, this is impossible. It could however be examined if there are differences in personal characteristics between those who choose a DTS and those who choose the traditional driving course.

What is known about the safety value of the DTS?

Course contents
The final report of the European BASIC project about driver training models (Hatakka et al., 2004) describes the ideal driver training as:
– having clear learning objectives and contents;
– giving enough feedback to improve behaviour and to learn;
– theoretical and practical training supporting each other;
– offering the possibility to gain enough experience*;
– providing a realistic environment to practice the necessary skills;
– having a learning period which is long enough to let the skills and knowledge take root, and a learning climate which focusses on safe traffic behaviour*.

It recommends the following:
– structuralize the driver training and phase it from easy to difficult;

– alternate the periods of formal training with periods of accompanied driving (introduce a graduated driving licence)*;
– improve the quality of the driving instructors;
– structure and monitor the periods of accompanied driving*;
– spread the driving licence over the various parts of the graduated driving licence*.

The DTS meets most of the criteria and recommendations formulated by the BASIC project, but not those marked with * and which are inherent in a graduated driving licence.

Concerning the didactics of the DTS it may be assumed that the use of scripts will enhance learning schemata. Schemata are mental structures in relation with reality. For example, someone driving on a motorway with the schema 'motorway' activated in the brain, will not expect oncoming traffic. Schemata assist the road user with predicting what could happen next. The retention may be somewhat smaller in the DTS, because that what has been learned is forgotten faster in structured learning (Groeger, 2000).

Pass rate
In 2001, a small scale test with the DTS took place in the Dutch province of Gelderland (Nägele & Vissers, 2001). For the 109 DTS learners, the pass rate on their first driving test was 83%. In the period immediately before the DTS was introduced, the pass rate at the same driving schools was 46%. In addition, the DTS learners had not needed more lessons than regular learners in the same driving schools before the DTS was introduced. From January 2002 to April 2003, Gelderland carried out a large scale follow-up study in which 557 DTS learners participated. In this study their pass rate was 75% compared to 53% for the regular driver training given by the same driving schools before the DTS experiment. This time, the DTS learners took slightly more driving lessons than those who followed the traditional course, but the difference was not significant (Nägele & Vissers, 2003). In addition to the pass rate this second DTS evaluation analyzed the quality of the learners during the practical exam. For four skills a score of from 1 to 10 was awarded:
– technical handling of the vehicle;
– traffic insight;
– application of traffic rules;
– using 'The new driving force', a new, more cost-effective and environment-friendly style of driving.

On all four skills the DTS learners achieved significantly higher scores than regular learners. It should be noted that the examiners knew beforehand which learners had followed the DTS and which had not. This may have influenced their judgement.

Without a doubt, the DTS can be said to have a high pass rate. However, this may not so much be the effect of the DTS, but could be caused by learners who choose DTS having other qualities than those who do not. This has already been discussed in the section about self-selection. Both the assessment studies of Nägele & Vissers (2001; 2003) and the Periodic Driver Training Study (PRO) (Hazevoet & Vissers, 2004) briefly looked which type of drivers had chosen the DTS and which the traditional training. Some small differences in sex, age, and education level were found, but these differences were not the same in either of the assessment studies and in the PRO. The aspect of self-selection has not been sufficiently studied to determine whether it has had an influence on the pass rate.

Are DTS learners safer drivers after having passed their driving test?
The most recent study of the DTS was an assessment based on a test drive (Vissers et al., 2004). This test drive was part of a study into the effect of a refresher course after having had a driving licence for about *six months*. The course participants had been both DTS learners as well as non-DTS learners. Probably, the non-DTS learners mainly followed the traditional training, but a more or less structured course different from the DTS, or a compact course, may have been other possibilities. The examiners who supervised these test drives did not know which type of driver training the participants had followed. The skills which the examiners assessed during the test drives at the beginning of the refresher course are given in *Table 1*.

The table shows that the DTS group performed better than the non-DTS group in 17 of the 20 skills. However, the differences were generally rather small, and were statistically significant for only 3 of the 17 skills. There is an easy explanation for the fact that the DTS group drove considerably more economical than the non-DTS group. From the very first lesson of the DTS, the new driving style 'The

new driving force' is taught, but this is very rarely done in the traditional training. The clearly better vehicle operating skills of the DTS group may be due to the fact that the DTS learner can only start practicing traffic situations once vehicle operation has been mastered. The use of scripts possibly also plays a role here. Working with clear procedures could result in reaching the level of automatism sooner. It is strange that the DTS group anticipates significantly better, but is hardly any better in risk awareness, hazard perception, and traffic insight. The question remains how well driving examiners can assess the higher order skills such as defensive driving, hazard perception, and risk awareness. They do not have to explicitly examine learners on these aspects in the regular driving test. It may be the case that the reliability of the expert judgements of higher order skills leaves to be desired.

Subject	Score	Subject	Score
Journey preparation and journey end	-	Adapted and decisive driving: speed	+
Vehicle operation	**+***	Adapted and decisive driving: determined actions	+
Vehicle control	+	Driving on straight and bendy roads	-
Driving economically (The New Driving Force)	**+***	Behaviour at intersections	-
Solo driving	+	Behaviour when turning off	+
Social traffic behaviour	+	Merging and exiting	+
Defensive driving behaviour: anticipating	**+***	Overtaking and passing	+
Defensive driving behaviour: effective scanning	+	Oncoming traffic and being overtaken	+
Defensive driving behaviour: safety margin and headway distance	+	Changing lanes and moving sideways	+
Risk awareness, hazard perception, and traffic insight	+	Driving on exceptional road sections	+
+* statistically significant *(p< 0,05)*; + RIS better; - RIS not better			

Table 1. *Test drive results DTS vs. regular driver training (from Vissers et al., 2004).*

Is the safety value of the DTS higher than that of the traditional types of driver training?
The DTS looks good with regard to contents and its high pass rate, when compared with the traditional driver training. Although it is too early for the indisputable conclusion that the DTS has a higher safety value than the traditional training, the expectation is justified. Six months after having passed the driving test, the traffic behaviour of novice DTS drivers is somewhat better on many aspects than that of non-DTS learners, and even is significantly better on three points. However, even this difference in behaviour does not justify the conclusion that the DTS has a higher safety value than the traditional training. After all, the learners themselves have made the choice between the DTS and the traditional training, so there could easily be an effect of self-selection as mentioned earlier. The learner who chooses DTS may be a learner who has other qualities than the learner who chooses the traditional training. This could explain the difference in behaviour.

Conclusion
More so than the regular driver training, the DTS is based on training objectives that are directly related to road safety. Although it is unknown how systematically these training objectives are followed by the DTS qualified driving schools, this driver training may be assumed to contain more safety related components than the average regular driving training. DTS learners having a higher pass rate does not say much about the safety that can be expected from this group. The fact that six months after the driving test the DTS learners usually perform better than non-DTS learners, is a better indication that the DTS is a step in the right direction. However, this conclusion must be drawn with great care, as this may be the result of self-selection and because the differences are minimal.
Seen from an educational perspective, the DTS is probably better than the traditional course where transfer is concerned (application to practice), but it may not be for retention (sinking in). The DTS learning period may be too brief for its advantages to show clearly. If the DTS were to be linked to a graduated driving licence system, the DTS advantages could possibly show more clearly, and all the criteria and recommendations of the European BASIC project could be met.

Publications and Sources
(SWOV reports in Dutch have an English summary)

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