

**ABSTRACT TITLE: Higher Order Skills in traffic: the new “must haves” of a driving training and testing**

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**Introduction**

Driving has since long ago been much more than a matter of technical control of the vehicle and capable handling of traffic situations. Higher Order Skills (HOS) have become more and more recognized as the fundamental stone for safe driving behavior. The term usually refers to cognitive skills such as hazard perception, but also social-affective skills such as risk awareness, self-awareness, empathy for others and the motivation to drive safely. Calibration is also an important higher-order skill, giving the driver the ability to engage in task situations that match one's abilities.

Moving further away from the cognitive processes the traditional driving task entails, a new set of skills required by external, technical changes to the driving task, can no longer be overlooked. This relates, but is not limited to, to the increased use of Advanced Driver Assistance Systems, some of which are already obligatory in new cars from 2022.

**Aim**

Are Higher Order Skills already addressed in current driver training and testing? Which educational methods are suited to teach them to young novice drivers? How are these skills assessed at the moment?

This series of questions laid the foundation of a research study<sup>1</sup> on the ways in which HOS can be taught and tested successfully. In this research, examples of methods, materials and points in time have been collected from different countries, showing that some skills are easier to teach and test, especially when specific methods are used.

How can we further build on this knowledge so drivers of the future possess the full set of necessary skills? Can the ADAS-related skills be considered as Higher Order Skills and treated as such? And to which extent and in which way can the driver reliably be tested on them?

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<sup>1</sup> <https://open.overheid.nl/repository/ronl-cad91d06e3cfae06528bd3ec5fe45bbfd525f50/1/pdf/bijlage-eindrapport-hogere-ordevaardigheden-in-het-verkeer-september-2022.pdf>

At the moment, research work is being carried out to provide answers to these questions in the framework of the development of a national curriculum for driver training in The Netherlands. Building on a set of measures suggested for the improvement of quality of the driver training in the country<sup>2</sup>, the national curriculum to be developed is expected to include details on learning goals and standards as well as educational design and methods for testing.

The aim of this presentation is to share research findings on the Higher Order Skills that should form part of driver training and testing. Methods and materials will be discussed that can be used for successful skill development and testing of the newly acquired skills.

### Content of ongoing research

#### *Integration of Higher Order Skills in learning objectives*

We propose the integration of HOS into the training based on an inventory of final objectives, sub-split into interim objectives. These objectives should be taught in four modules, as now distinguished by the training program “Driving Training in Steps”<sup>345</sup>. The table below contains a proposal for the structure of the final objectives, which have to be worked out in detail for each training module. This structure is in line with the matrix with Goals of Driver Education (GDE) with the addition that more attention should be paid to HOS.

	Basic skills		Higher Order Skills			
	A. Knowing and understanding	B. Deciding and acting	C. Cognitive HOS	D. Calibration	E. Social skills	F. ADAS
<b>Goals for life and skills for living</b>						
<b>Goals and context of driving</b>						
<b>Driving in traffic</b>						
<b>Vehicle control</b>						

#### *A modular educational design for Higher Order Skills in driver training*

The use of modules in the training process enables the exposure of the learner driver in traffic situations of increasing complexity, enabling stepwise and just-in-time development of knowledge and skills. In a modular training of e.g., 4 modules, some HOS, like calibration and self-awareness appear already in module 1 (highly assisted driving in simple traffic situations and restricted task conditions), while others can only be taught later, like social-

<sup>2</sup> <https://open.overheid.nl/repository/ronl-a3bb9c8e-b5ef-4987-add9-f54abe329fe9/1/pdf/bijlage-1-van-rijles-naar-rijonderwijs-advies-verbeteren-autorijscholenbranche.pdf>

<sup>3</sup> Roelofs, E., Vissers, J., Tsapi, A. (2020) Naar een meer effectieve initiële rijopleiding in Nederland. Literatuuronderzoek Effectieve rijopleiding, Amersfoort, Nederland.

<sup>4</sup> Nägele, R.C. & Vissers, J.A.M.M. (2001) Rijopleiding in Stappen (RIS). Evaluatie van een proef in de provincie Gelderland. Rapportnummer TT01-62. Veenendaal, Traffic Test.

<sup>5</sup> Nägele, R.C. en Vissers, J.A.M.M. (2003) Rijopleiding in Stappen (RIS). Evaluatie van de vervolproef in de provincie Gelderland 2002-2003. Rapportnummer TT03-33. Veenendaal, Traffic Test.

affective skills. Very important elements of the modular educational design are the continuous integration of theory and practice, using the proper mix of materials and methods.

#### *Attunement of assessment during training and testing*

The measures suggested in the policy recommendations report of 2021<sup>2</sup> emphasize that several assessment moments should be present in the learning process of the learner driver. In fact, it is recommended to work with a (national) learner driver tracking system during driver training and to include all progress scores in a learner driver portfolio. As a further elaboration of the educational design, in our current work we are developing a framework for programmatic assessment in which we describe, based on concrete examples, which learning objective areas of the driver training should be assessed in which module and for what purpose. This involves:

- 1) formative assessment by the driving instructor to determine how far the student has progressed, which supports the learning process, and
- 2) summative assessment by the examiner to determine whether learning objectives have been achieved with final (or not) certification.

We also make a distinction between learning objective areas that are mainly tested in the theoretical training and practical training respectively. All distinct learning objective areas have to be assessed formatively in both the theory and practical training.

In addition to programmatic assessment, guidelines are also being developed for its composition, the tasks to be chosen, the method of scoring and requirements for the evaluators/examiners, the formation of test scores and the weighting of data points to form a final assessment.

#### **Relevance of Higher Order Skills for CIECA**

Either driver training determines the content of driver testing or the other way around, young driver candidates should be taught and assessed on a complete set of skills, including the skills created by traffic situations of increasing complexity and by modern mobility concepts.

The presentation of our research findings on the inclusion of Higher Order Skills and ADAS related skills in the training and testing aims to create common understanding about:

- which skill set we define as necessary in training and testing;
- which training method is best suited for which skill (type);
- which skills can be assessed reliably and validly assessed in the driving test;
- which skills cannot be assessed reliably and validly in a driving test and should therefore be covered by driver training (with control on if the skills are trained in a proper way).

Driver licensing organizations can use these insights to reflect on the potential adaptations of their assessment structure and content, ensuring that they contribute to a world where young drivers are ready to safely deal with the modern traffic concepts and challenges.