

# To what extent does automated technology have a focus in today's driver training?

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c/ieca

### Nord University - Norway

#### 200 students to be trained traffic teachers'

-Road Traffic rules
-Pedagogical subjects
-Skill training
-Psychology
-Technical competence
-Technical development











Exploring how automated technology and advanced driver-assistance systems (ADAS) are taught in the Norwegian driver-training industry. A qualitative study.

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Car technology is rapidly evolving, with advanced driver-assistance technology changing the role of the driver. This Car technology is rapidly evolving, with advanced driver-assistance technology changing me role of the driver. Inis should be reflected in the teaching of learner drivers. However, little pedagogical research is available in this field should be reflected in the learning of learner drivers. However, mus pedagogical research is available in this leaf tor the driving-instructor measury to draw on, and intre is known about now this is taught within the driving-instructor industry. Therefore, we explored the research question, How does the Norwegian driver-training industry instructor industry. Ineretore, we explored the research question, How does the Norwegian driver-training industry teach advanced driver-assisted technology to learner drivers? We interviewed 10 driving instructors from different teach advanced driver-assisted technology to learner drivers? We interviewed to driving instructors non driveral parts of Norway and used thematic analysis to analyse the data. We found that teaching does not correspond with parts or Norway and used mematic analysis to analyse the data. We found that teaching does not correspond with technological developments. The driving instructors do not define learning outcomes related to new technology, and the next sector of the secto technological developments. The driving instructors do not denne learning outcomes related to new technology, and the national curriculum is not well suited for the developments in automated technology. There is a need for the national curriculum is not well suited for the developments in automated rechnology. There is a need to knowledge within the driving-instructor industry concerning developing pedagogical processes suitable for

Keywords: driver training, ADAS, automated technology, learner driver, teach, driver-assistance technology, driver

behaviour

1. Introduction

Car technology is evolving fast. Every year, new technological solutions are presented for drivers, and the technology is becoming increasingly complex and automated. It also differs between car manufacturers, resulting in a lack of standardization. The driver-training industry must consider the rapid pace of development in their training and pedagogical teaching (Sætren et al. 2018). However, how the Norwegian drivertraining industry use new technology, present it for learner drivers, and teach it for desired learning outcomes have not been explored. Consequently, the research question was, How does the Norwegian driver-training industry teach advanced driver-assisted technology to learner

Next, we present literature on levels of drivers? automation, recent literature on how automated technology should be taught to learner drivers, and an overview of the Norwegian learner-driver curriculum.

1.1. Levels of automation Several taxonomies have attempted to capture the essence of the development of advanced

technology in cars, and the most common seems to be the levels of automation set out by the Society of Automotive Engineers (SAE; 2021). This approach is based on six levels of automation ranging from no automation (Level 0) to full automation (Level 5). Level 0 is no driving automation, Level 1 is driver assistance, Level 2 is partial driver assistance, Level 3 is conditional driving, Level 4 is high driving assistance, and Level 5 is full driving automation. In SAE Levels 0 to 3, the human driver is responsible for driving. and in SAE Levels 4 to 5, the car takes on this

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Relevant content in the curriculum defines various areas in which new technology can be implemented









## Methods

□ A qualitative design for this study, conducting semistructured individual interviews and using thematic analysis to analyze the transcribed interviews

- □ The informants for this study were driving teachers. For a varied sample, we invited driving teachers from different parts of Norway with varying experience in teaching learner drivers
- Due to coronavirus restrictions, the interviews took place digitally via Zoom Meetings or Microsoft Teams or telephonically. All interviews lasted 45–60 minutes and were transcribed for analysis
- □ Before the interviews, we developed an interview guide that consisted of themes and questions regarding how driving teacher implemented technology in their teaching

"What learning outcome is your objective for your learner drivers when you teach about new technology in cars?"





Themes related to automated technology and advanced driver-assistance systems (ADAS) taught in the Norwegian driver-training industry

ategory Illustrative
explanation
Level of Training and
aining learning do not
id align with
arning technological
developments.
Learning The driving teacher
atcomes does not define the
learning outcomes
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Themes related to automated technology and advanced driver-assistance systems (ADAS) taught in the Norwegian driver-training industry

	Category	Illustrative explanation	
	1 Level of training and learning	Training and learning do not align with technological developments.	
	2 Learning outcomes	The driving teacher does not define the learning outcomes besides the learner driver's experience.	
	3 Potential and limitations of the curriculum	The curriculum is vague on specific formulations that deal with technology. The concept of driver- support systems has a broad scope for interpretation.	
2022 CIECA	4 Need for knowledge	The driving teacher recognizes a great need for new knowledge about technology but is uncertain about how to update such	

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### Level of training and learning

### Training and learning do not align with technological developments

					Full Automation
0	1	2	3	4	5
No Automation Zero autonomy: the driver performs all driving tasks.	Driver Assistance Vehicle is controlled by the driver, but some driving assist features may be included in the vehicle design.	Partial Automation Vehicle has combined submated functions, like acceleration and sterring, but the driver must remain engaged with the driving task and monitor the environment at all times.	Conditional Automation Driver is a necessity, but is not required to monitor the environment. The driver must be ready to take control of the vehicle at all times with notice.	High Automation The vehicle is capable of performing all driving functions under certain conditions. The driver may have the option to control the vehicle.	Full Automation The vehicle is capable of performing all driving functions under all conditions. The driver may have the option to control the vehicle.

(3) (PDF) Assessing Alternate Approaches for Conveying Automated Vehicle "Intentions" (researchgate.net)

knowledge.

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#### Potential and limitations of the curriculum

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*The concept of driver support systems has a large scopes for interpretations* 





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knowledge



#### Need for knowledge

The driving teacher recognizes a great need for new knowledge about technology, but is uncertain about how to update such knowledge



# Conclusion

The driving-instructor industry is in the midst of great technological change. There is no formal way of updating instructors' knowledge; thus, there are large variations in teaching new technology based on instructors' own interest in keeping up to date with these technological developments.

Considering the variations in the technological standards in cars on Norwegian roads, these variations must be reflected in the driver-training programme as well.

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