

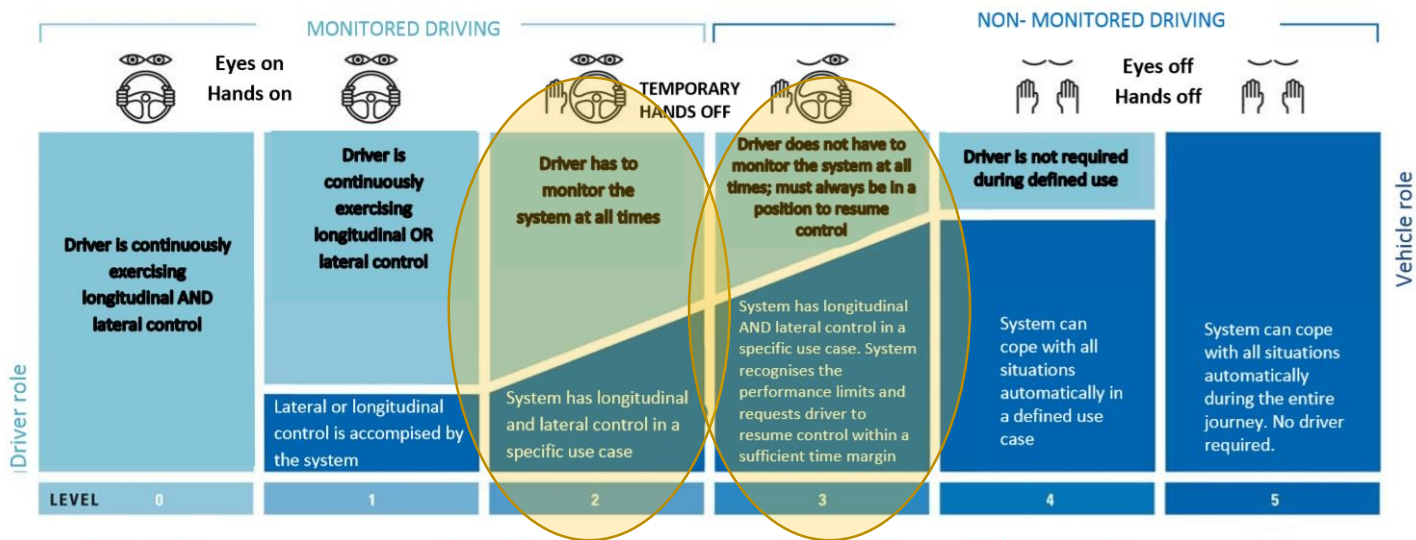


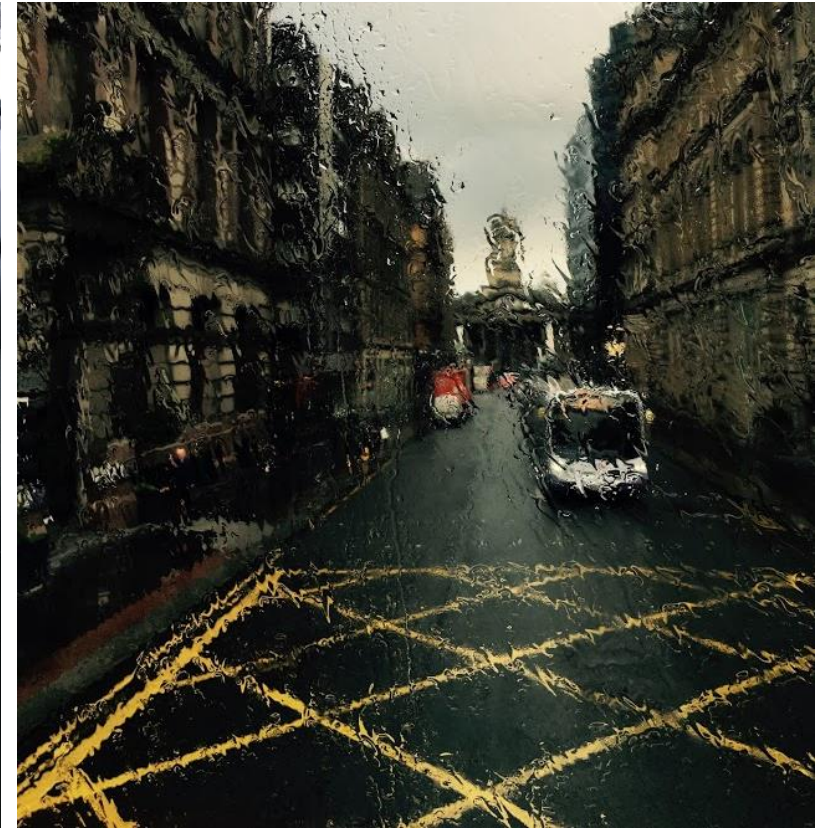
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5-8 JUNE 2019

Simulator training and ADAS. Dr. Gunhild B. Sætren

ADAS

Figure: Different levels of automation (source: Society of Automotive Engineers-SAE¹¹)





Why train for automation

- Tasks increase with increasing automation
- Tasks change with increasing technology
- We do not know how people use ADAS
- Lack of standardisation
- How does different ADAS work in different driving conditions?





Proposal based on a five-level GDE5-SOC matrix
(Keskinen, Peräaho & Laapotti, 2010)

5 Social environment

e.g. culture, legislation, enforcement, subculture, social groups, group values and norms

4 Personal goals for life, skills for living

e.g. lifestyle, motives, values, self-control, habits, health

3 Goals and context of driving

e.g. trip related choices, goals, driving environment, company

2 Mastery of traffic situations

e.g. rules, observation, driving path, interaction

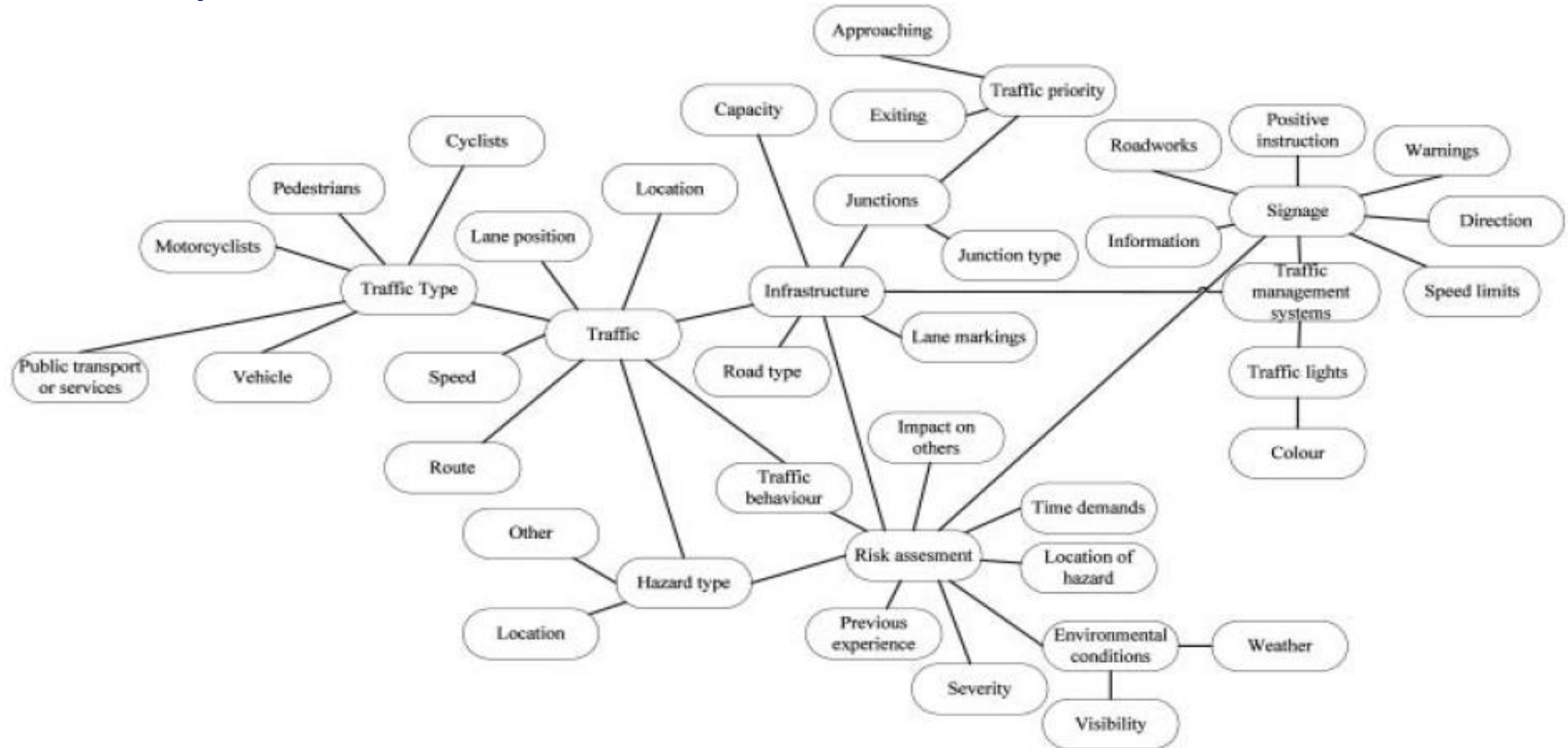
1 Vehicle handling and manoeuvring

e.g. gears, controls, direction, tyre grip, speed adjustment

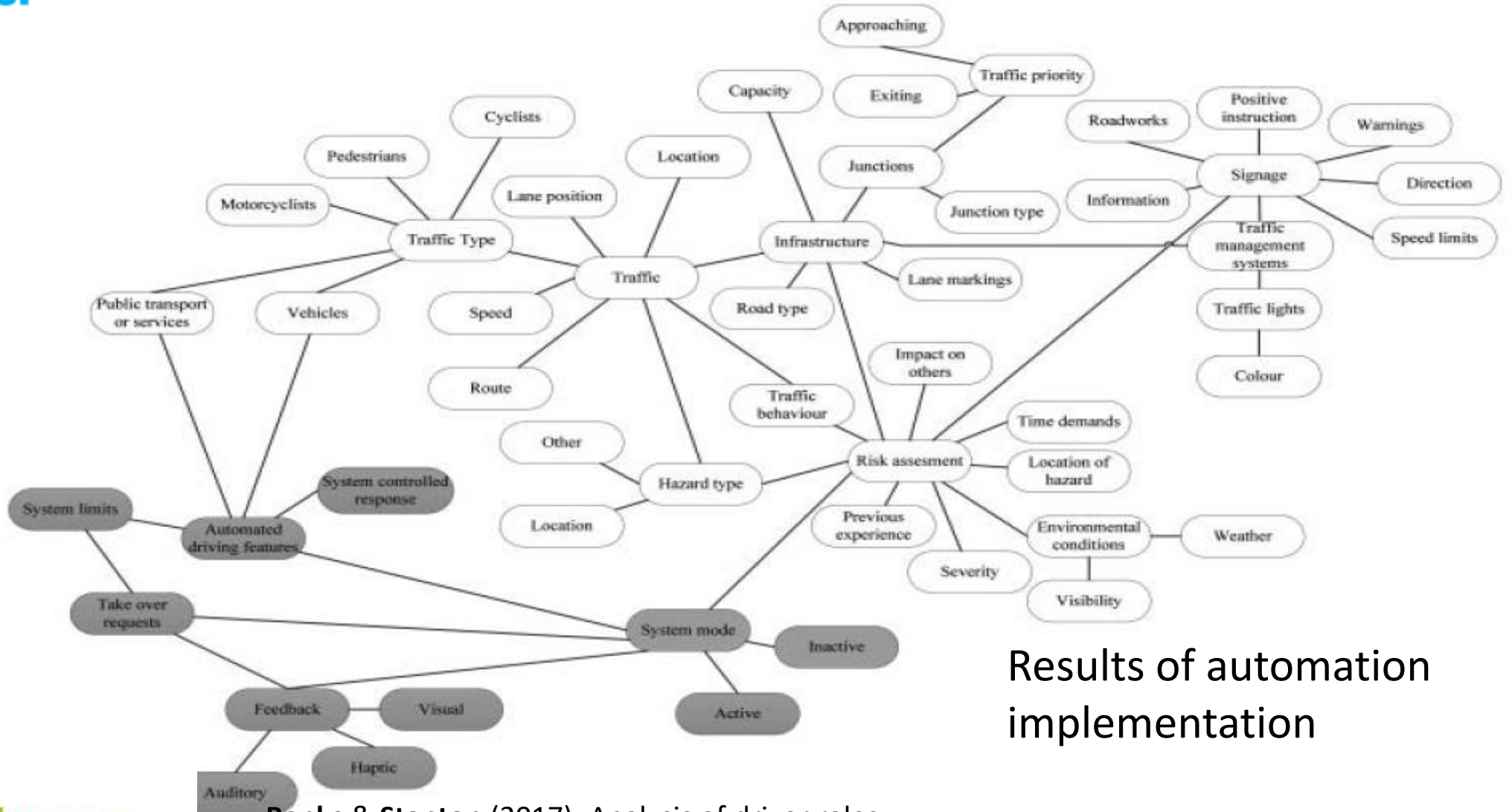


Will driver training still be needed?

Analysis of driver roles



Analysis of driver roles in automated driving systems



Results of automation implementation

Banks & Stanton (2017). Analysis of driver roles:
Modelling the changing role of the driver in automated driving systems

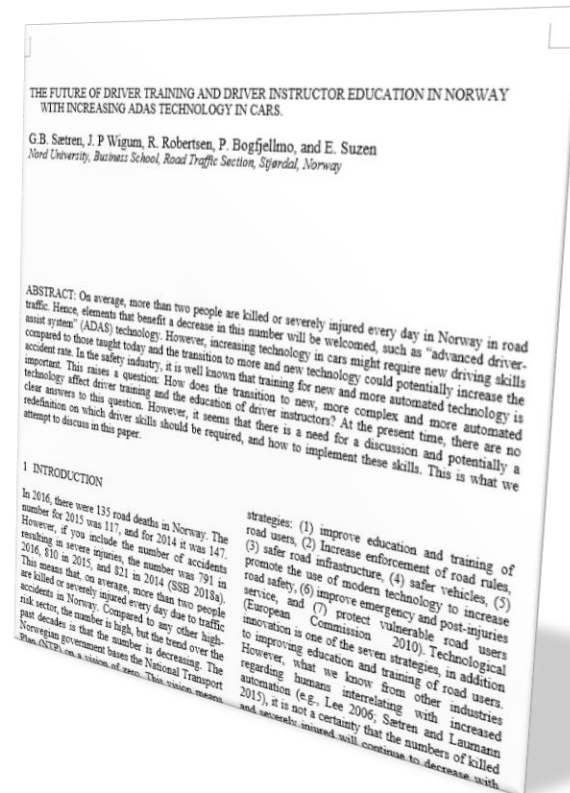


Driver training and ADAS

- How to train for the new technology?
- Are there differences between novices and experienced drivers?

ADAS – Advanced Driver-Assist System, driver training, and human factors

- Transition phase could increase risk
- Transition from operating to monitoring
- Tactical and strategic choices are made by others
- Lack of standardization
- Mode confusion
- Lack of situation awareness
- Trust in technology



Where is the research on driving simulators?

2009-2019

- **Health: Driving skills**
 - Different illnesses
 - Under the influence of drugs
 - Sleep deprivation
 - Different motoric challenges
- **As an experimental tool**
 - How speed, risk perception, human error and so forth affect driving skills.
- **Training**
 - Eco-driving (and ours on dark driving not published yet)
- **Transferability to In Real Life (IRL)**



Why simulator training

Environmentally friendly

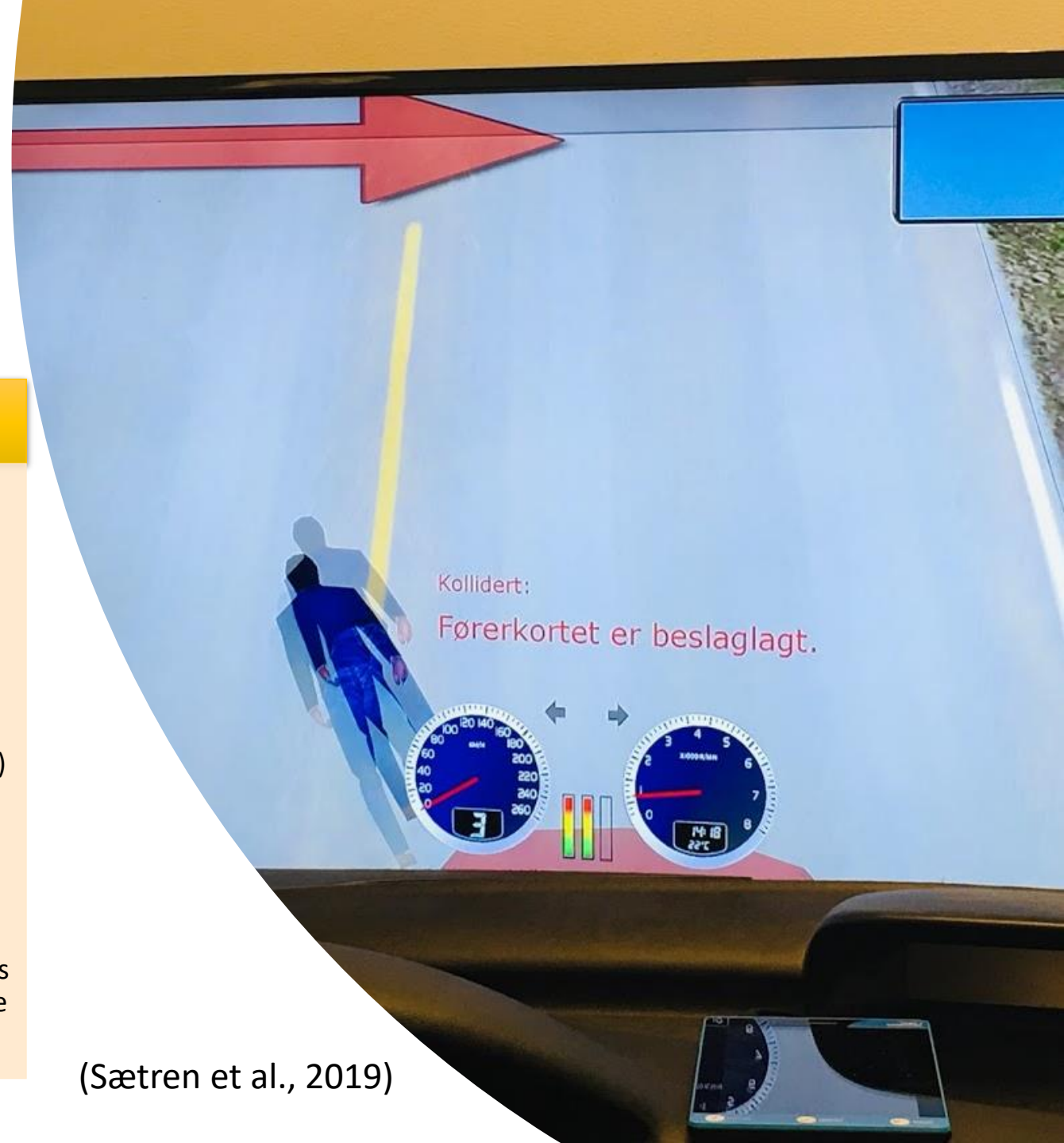
- Avoid queueing
- Wear and tear on tyres
- No fuel
- Less costs than car
- Wear and tear on brakes and car in general as well as road structures

Calmer learning environment

- Students and learner drivers are less stressful while learning – especially important in early learning phases independent on what level learning is (all levels in GDE matrix)
- Instructor can focus on the student/learner driver in stead of paying attention to real life traffic

Safety

- Student/learner driver get to train on the task she/he is supposed to
- Possibility for repetition
- Access to scenarios (dark, snow, wind, rain, queue, moose)
- Possibility to make errors in a safe environment
- The trainer do not need to find sufficient dangerous situations in real life traffic.



(Sætren et al., 2019)

Why simulators

- Forgiving environment
- Variation possibilities
- Easy access to different scenarios
- Environmentally friendly
- Our latest research (to be presented at ESREL2019)
 - Use it with an instructor present
 - Use it for all levels of the GDE matrix
- Simulator Training in Driver education (SitT)
 - 4 year study (Nord University and NTNU Social Research)
 - Financed by the Norwegian Research Council



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