Benefits of using driving simulators when training for automation

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Most industries today have a high degree of automation, but there are some known challenges with human-automation interaction. One of the greatest challenges is for the human to maintain concentration while the automation working such that they can correctly perform required actions when the automation expects the human to intervene. There is a significant body of research on these types of interactions in highly automated industries such as nuclear, petroleum, aviation and so forth. However, less is understood about the effects of automation on driver behavior in the automotive industry, and how driver training should address these challenges (Banks et al., 2018).

Modern cars are increasingly complex and sophisticated; most cars are now sold with a vast array of sensors that make up the Advanced Driver-Assistance Systems (ADAS) as standard. However, the technology available for driver training does not typically equal the technology available in most cars on the road today. In Norway, modern driver training technology is not widely used, and most driving schools still use manually-geared cars for training. Given the fast pace of development of technology in cars, including the growing trend towards some form of autonomous driving capability, it seems more feasible that driving simulators will be the solution for driver training in the future.

Still, there might be some challenges in regard to implementing simulators as a part of common driver training in Norway. Driving simulators are not commonly used in Norway. A four-year project funded by the Norwegian Research Counsel called “Simulator Training in Driver Education” (Sætren et al., 2018) identified that, out of 1033 driving schools in Norway, only 5-10 used driving simulators and these were only capable of teaching up to Level 2 in the Norwegian 4 level stepwise driver training education (NPRA, 2018). In Norway, none of the existing driver training simulators provide training for new technology

such as hands-free or feet-free driving. This is partly due to regulations which require manual operation of the car during training, and so simulators are designed according to the regulations. Further, as of today there are no market for the use of simulators in Norway. There is no shortage of driver instructors such as in Germany for instance. In Norway there are enough roads to practice on, driver training is not subject to higher risks, such as in surgery, and the costs are not as high for real life training such as in aviation. Additionally, The Norwegian driver training model includes both theory and practice and emphasises operational, tactical and strategic driving skills and the GDE framework that divides the training into different steps. A consideration could thus also be if simulator training should be used in all 4 stages, or will such training have greater and more targeted effect in specific steps.

However, there are several other potential advantages to using advanced driving simulators for training instead of traditional manually-operated cars on the road, especially for scenarios that are difficult to replicate in a naturalistic setting on the road (De Winter et al., 2012). For example, simulators can be used to train drivers in how to operate the car manually in the case where self-driving technology fails or unexpectedly hands control back to the driver due to some external factors such as poor weather. Simulators could also be used to replicate difficult driving conditions such as extreme weather (such as we get in Norway), deteriorated road infrastructure or unexpected obstacles on the road, where again the ADAS technology may not operator correctly and the driver has to monitor or even take over manual control of the vehicle. In addition, simulators could be used to train drivers on different types or brands of technologies, since there are some issues of lack of consistency in how ADAS' are presented and function between different car manufacturers.

References:

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