Can I keep up with my car?

Vehicles getting more complex; many may need to make an attitude shift

By Tim Lougheed, Ottawa Citizen November 3, 2011 (Boomer, Fall 2011)

As drivers age, cars can be become **frustratingly complex**.

![Ata Khan in a driving simulator at Carleton University: A good interface between driver and machine is crucial.](image)

Photograph by: Bruno Schlumberger, Ottawa Citizen

One day, you might look back and wonder when exactly the interior of a car stopped being the familiar, comfortable environment you have inhabited for decades. It might have been when the trusty spinning wheel odometer morphed into an LED readout.
Or when the friendly twist-dial tuner of the radio gave way to a set of buttons and a readout for the exact frequency of each station. Or when a screen was installed right in the middle of the dashboard, and you were not quite sure what all it could do.

Or perhaps it was the first time you got into a car that was outfitted with a joystick instead of a steering wheel.

OK, that last portent is still confined to the realm of concept cars that manufacturers use to tease the crowds at auto shows.

But there is nothing to impede this kind of innovation, since the mechanical necessity for a steering wheel is long gone. Its role as a functional rack-and-pinion tool has been supplanted by electronic controllers that simply transmit the motions of the wheel.

A joystick could serve that purpose just as well, and could even do a better job. In fact, most of the changes found inside our vehicles represent just this kind of progress. Practically all of the hardware found on a Model T would have had some recognizable counterpart on vehicles as recently as the 1990s. But over the past decade, what happens under the hood owes just as much to computing muscle as internal combustion, and what drivers see on the panel in front of them is a dazzling display that might have left Henry Ford gaping in awe.

It might also have forced him to confront a hard question: "Can I drive this thing?" That same query could well be hanging silently in the air around many dealer showrooms as confident, experienced drivers consider new products that could challenge their driving skill set.

According to Jan Polgar, a professor at the University of Western Ontario's School of Occupational Therapy, much of that challenge stems from an apparent surrender of control over the vehicle. Letting a GPS unit tell you the quickest route home is one thing, but letting your car decide not to run into the car ahead of you is more than many people are prepared to tolerate.

Polgar is one of the lead researchers with the Safe Transportation for Seniors project, part of AUTO21, a Canadian Network of Centres of Excellence that was launched in 2001 to bring together hundreds of experts from across the country to explore a wide range of issues related to the automobile. Her contribution has included surveys of older drivers on their willingness to embrace cutting edge technologies on the road.

"We asked them about confidence, and whether they'd be willing to try things like adaptive cruise control," she says. This system, which has been common on many European cars as well as a selection of North American models, uses a forward-looking radar to detect the distance to a car in front. Below a critical threshold, the system will automatically drop out of cruise and apply brakes to prevent a collision.

Polgar's survey found that drivers over the age of 75 expressed a discomfort with relying on such a system. Below age 70, she adds, respondents expressed more willingness to give this technology a try, although in both cases male drivers expressed more confidence than female drivers.
For her, confidence is an essential ingredient to coping with the novelty of gadgets, from GPS to Bluetooth phones. Young people are often portrayed as having a monopoly on this kind of confidence, but Polgar says people of all ages are more than able to master devices as they see fit.

"Given sufficient training and guidance as to what to look for when purchasing a vehicle," she says, "people can learn to use the technology."

A more profound hurdle, however, is how much time and patience is required to achieve that mastery. Even if the traditional tasks of driving have become familiar to the point of being intuitive and almost unconscious, new devices can create distraction and unease under demanding conditions. There is already plenty to occupy the mind just in keeping a car between the lines on the road at high speed; add a chattering GPS or warnings flashed on a screen, and you can reach the limit of what Polgar calls "cognitive load."

Ata Khan, a professor of civil and environmental engineering at Carleton University, has dedicated much of his own research to the implications of cognitive load. Much of that load could be imposed on the car itself, he points out. The responsibility for avoiding collisions or losing stability can be transferred to automated systems, enhancing the performance of drivers at every age and skill level.

"It should be able to help every component of the driving population," he says. "Young drivers, to take away the edge; middle drivers, to keep them alert; and older drivers, to reduce distraction and extend capabilities."

He refers to the result as a "cognitive vehicle," the name given to one of the research themes for Automotive Partnership Canada. This five-year federal initiative is putting $145 million into research to make the country's automotive industry more globally competitive.

Khan argues that the cognitive vehicle will be able to carry out sophisticated functions, such as allowing cars to communicate with one another in order to travel in efficient convoys on major highways.

At the same time, cars are increasingly marketed as venues for different forms of entertainment. When GM touts its OnStar communications system as a means of allowing drivers to monitor their Facebook accounts while on the road - as one recent TV commercial illustrates - then the perceived virtues of a car have definitely transcended such traditional considerations as leg room and fuel economy.

Although that might strike some observers as a frivolous application, any of us should be able to drive such cars, regardless of whether we take advantage of everything they can do. The key, Khan maintains, is a comfortable interface between car and driver. His research as a part of the Canadian Automobile Research Simulation (CARS) project, which is also funded by AUTO21, has pinned down the characteristics of that interface. His findings point to the value of a single, in-vehicle platform to handle all information exchanges through voice commands. In this way,
drivers could simply interact with the technology to whatever extent they wish - updating their Facebook settings, checking for traffic ahead, or enjoying some peace and quiet.

Khan hopes that a future high fidelity sophisticated driving simulation facility at Carleton will provide further insights into the driver-vehicle interface. It should even allow all of us to sidestep the awkward question, "can we drive this car?" Instead, a different query arises.

"Could we use advanced technology to our advantage, rather than disadvantage?" Khan asks. "This is what we're working on. It should not be overpowering, it should be very functional, so that the driver is alert all the time."

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