



Factoring human limitations and user needs into telematics

How human factors research is leading telematics devices towards greater market acceptability, safety and user-friendly appeal. By **Frank Spillers**, Principal & Co-CEO, Experience Dynamics.

Tomorrow's cars will do more than drive us back and forth. In-car access to wireless email, Internet, satellite radio, navigation aids, DVD's and rear-seat entertainment devices are on the list of telematics currently in development for 2003 and beyond. But how will these devices address user needs and offer compelling

US\$50 billion over the next five years according to Arthur Anderson Consulting.

Research by such organisations as the Driver Distraction Internet Forum (NHTSA USA) and the EU funded consortium project known as COMU-NICAR have uncovered startling results that on-board hardware and software

focusing on the driver user experience and product satisfaction issues as they matter to the consumer.

Consumer satisfaction is an important piece of the telematics end user puzzle. According to Rick Bentley of TelEvoke, "Designing a successful mass-market telematics system depends on one critical factor: understanding the

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presentation of data? And how will the hardware and software design of new telematics devices adequately address the delicate needs of human cognition with practical risk-free information access?

It seems that the technology is not ready for consumers to enjoy in-car communication, information and entertainment devices. However, as the wireless industry in the US and Europe is finding out, wireless phone services, like automotive telematics, have a bigger problem to face: usability. Poor usability in an in-car device can easily result in frustration, loss of control of the vehicle, injury, lawsuit or death.

Consumers are becoming less tolerant to unnecessary stress caused by interactions with confusing buttons, unclear screens and convoluted design interfaces. The bottom line for telematic devices is that they must by-pass and minimise driver distraction and enhance driver situation awareness if they are to capture audience attention and prevent driving disasters.

New advances in human factors research of automotive telematics have

can easily address usability issues. For instance, a study by NHTSA USA reports “use of hands-free cell phones significantly reduces awareness of the immediate traffic environment and slowed choice reaction time, particularly during the early stages of conversation”. One explanation for this may be that holding a device provides a physical reminder of the task, as opposed to getting lost in the conversation without any physical reminders.

The more that telematic devices are observed in the context of their intended use, the better the cognitive “fit” will be between the user and the device. A year 2000 user needs study involving user testing by COMUNICAR (made up of firms such as Volvo and Daimler Chrysler), found that acoustic collision warning systems added unanticipated distractions due to a lack of visual cues about the direction of the other vehicle. Further issues such as annoyance to the driver caused by false alarms add more insight into design requirements. User testing for usability issues is being shown to be a powerful guide to design refinements. User acceptance or usability

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needs of the customer”. Customer needs are typically embedded in the user’s task environment. Observations are made based on behaviour and habits users expose in the context of solving their problems.

User needs and desires are major factors governing the willingness of consumers to use these devices. For instance, research by Ducker Worldwide found that 60% of new owners of telematics equipped vehicles had NOT activated or used the devices. For directly related reasons, DETR UK has issued a human factors telematics agenda with a key item involving the understanding of the ‘what, how and why’ of travelling behaviour.

Much of the user needs research to date in Europe, Japan and the US has been limited to market research. However, the e-business web experience has led many firms in the US to adopt alternative methods of gathering data around user needs, functionality and desirability. The growing belief is that traditional market research techniques such as focus groups are inappropriate for gathering user needs requirements.

search of automotive telematics have uncovered surprising findings that point to a new approach to bolstering the telematics industry that is valued at

refinements. User acceptance or usability testing results in detecting error prevention and is being shown to safeguard telematics investments by

five years”

for gathering user needs requirements. What consumers say and think and what they actually do are two different types of data. In interface design infor-

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mation, examining what people DO has more precedence in specifying functionality as well as choosing the right interaction techniques.

Going beyond market research, human factors innovations in the telemat-

spent in-car as it relates to information, communication and entertainment needs.

In our research we have uncovered young inventors in the US who have embedded their own hand-made telem-

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touch screen and wireless mouse interactions. While driving, his interactions are limited to changing a song with a joystick, which he finds superior to other hardware devices he has designed and installed.

ics arena are targeting issues such as the dynamics of driver situation awareness and distraction. User testing and field studies involve observation of driver behaviour and tasks in the context of time

atic devices into their cars and as a result have real life experience with driving and using the devices. One such enthusiast is Adam Cantor who has experimented with the effects of joystick,

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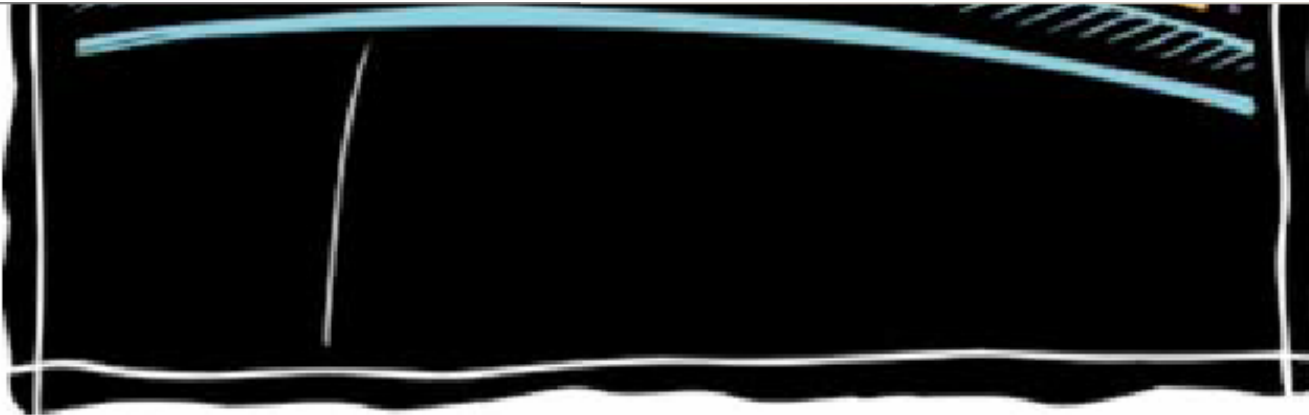
Understanding how consumers will use a device and more importantly how they are currently solving their problems without it, are central to the human factors role in telematic research.

Our research points to a delicate balance between audio, visual and tactile cues that simplify data interactions. These elements include large, clear buttons with distinct icons that are recognizable for instance by touch.

Designs must support low attention and multi-task environments. Similar conditions exist in collaborative virtual worlds. For this reason, many manufacturers are using virtual reality simulations to test scenarios of new telematic products. Prototyping designs as well as regular user testing can offer significant development savings and offer a window into how consumers will cope with the telematics.

The human factors of telematics are gradually becoming recognised as an advantage





in telematics R&D. The value of user-friendliness and desirability are crucial to market acceptance of telematic devices. The issues of providing appropriate data presentation that support consumer decision-making and minimize driver distraction are paramount to maintaining a leadership role in the growing telematics industry. 🇯🇵



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