

An examination of the effectiveness and acceptability of mobile phone blocking technology among drivers of corporate fleet vehicles

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Abstract

There is technology available that can block mobile phones while driving. The aim of this research was to determine if mobile phone blocking technology is an effective and acceptable method for reducing driver distraction among drivers of corporate fleet vehicles. Two different technologies were assessed: one required software to be installed on mobile phones, while the other technology used software in addition to external Bluetooth hardware that paired with the phones. A sample of 104 study participants who regularly drove a corporate fleet vehicle were recruited through a major corporation in South Australia. Each participant experienced one of the two technologies, and their opinions on the technology and phone use while driving were assessed using pre- and post-trial questionnaires. A majority of participants reported that phone blocking was not reliable but a majority nonetheless considered the technology they trialed to be an effective way of preventing phone use while driving. Mobile phone blocking technologies may provide a useful method of changing mobile phone use behaviour while driving. However, product improvements are needed to reach higher ratings of user acceptance and approval.

Background

It is widely recognised by safety researchers that mobile phone use affects driving performance because it places considerable cognitive demands on the driver, drawing attentional resources away from the driving task. Indeed, there is evidence suggesting that mobile phone use while driving increases the risk of a crash (Dingus et al., 2016; Elvik, 2011; McEvoy et al., 2005). McEvoy et al. (2005), in one of the most notable Australian studies in this area, examined the mobile phone records of crash-involved drivers and found that a driver is four times more likely to have a crash resulting in injury when using a mobile phone, irrespective of the handset used. A more recent study by McEvoy et al. (2007) involved interviews with hospital-treated drivers in Western Australia and found that 30 percent of drivers were distracted prior to the crash, including two percent who were using a mobile phone. Elvik (2011) undertook a meta-analysis of studies examining crash risk and phone use. Elvik noted that methodological issues had resulted in heterogeneous results but nonetheless determined a point estimate of an increased risk of a crash when using a mobile phone of 2.9.

In a more recent study, Dingus et al. (2016) analysed 905 crashes in a naturalistic driving study in the US. They found an increased odds ratio for various forms of hand held phone use in crash incidents, including: browsing on a mobile phone, dialing a phone, reaching for a phone, sending a text, and speaking on a phone. The overall odds ratio for hand held phone use in the crashes was 3.6 (95% confidence limits of 2.9 to 4.5) (Dingus et al., 2016).

The most common response to this issue has been to ban phone use while driving and utilise enforcement of these laws to reduce its prevalence. An important question then becomes whether laws against using a phone while driving are effective at reducing phone use and associated crashes. In their review of this literature, Kircher, Pattern and Ahlstrom (2011) of VTI in Sweden concluded that bans on phone use while driving tend to produce compliance in the first year but that phone use frequency returns to baseline levels after that. The review of EU states by Janitzek, Brenck, Jamson, Carsten and Eksler (2010) also found that the severity of penalties had no effect on self-reported

phone use rates while driving, and that self-reported use rates were also similar in countries with and without phone ban legislation. It is possible, however, that these findings all reflect insufficient enforcement.

Another interesting finding emerged from a naturalistic driving study of commercial truck drivers in the US (Hickman & Hanowski, 2010; Hickman, Hanowski, Camden & Alvarez, 2011). It was found that drivers' levels of mobile phone use while driving were consistent with fleet or company rules rather than with state legislation. This suggests that there is the capacity for fleet managers to influence drivers' mobile phone use more effectively than legislators. There are Australian corporations that have enacted or are considering enacting mobile phone bans for their vehicle fleet (Small, Bailey & Lydon, 2013), including the South Australian Department of Planning, Transport and Infrastructure. As occupational health and safety requirements are becomingly increasingly stringent, it is likely that preventing phone use by drivers of fleet vehicles can be accomplished using work health and safety (WHS) policies or regulations.

Given the equivocal findings of research into the outcomes of legislation prohibiting various forms of mobile phone use while driving, consideration needs to be given to alternative methods of controlling phone use. One option is to use technological means to restrict mobile phone operation when people are driving.

The *South Australian Road Safety Action Plan 2013-2016* has outlined a considerable number of key actions to help reduce serious casualties by at least 30 percent by 2020. One such action is to "Promote voluntary use of technology solutions that block incoming phone calls and messages while driving". The South Australian Motor Accident Commission (MAC) contracted the Centre for Automotive Safety Research to identify and evaluate a few of the more promising technologies.

Thirty-three products were briefly reviewed based on information available from publicity material on the Internet or details on 'app' (software application) stores. Around 21 products were claimed to be able to block incoming phone calls and messages. These were predominantly effective on Android based smart phones, while only a few products were claimed to be able to block incoming phone calls and messages on both iPhones and Android-based smart phones.

The aim of this study was to assess the performance of two phone blocking products in a field trial using a corporate vehicle fleet. With the assistance of MAC, a large South Australian corporation accepted an invitation to be involved in the study, permitting access to their staff as a potential source of volunteers to trial two different phone blocking technologies. Study participants were asked to report their attitudes and behaviour with regard to phone use while driving, and their impressions of the phone blocking technologies they experienced in the trial.

Method

Participants

Participants were recruited through a major corporation based in South Australia. The corporation assisted with promoting the project to its staff and organised information sessions at which CASR project team members described the study, explained how the various technologies worked, and invited staff to participate. Staff were reassured that their involvement in the study was voluntary and that they were free to withdraw at any time. Additionally, staff members were assured that if they participated they would remain anonymous, and that the corporation would not be informed who did or did not volunteer to participate. A total of 150 staff members registered an interest in being involved in the trial. Full participation in the study required a completed consent form and completion of both the pre- and post-trial surveys. Once those who did not meet these requirements were eliminated, the sample reduced to 104 (97 males, 7 females; age range 25-66, mean=48.9,

SD=9.1). The sample included employees in a range of roles within the organisation, including corporate, technical, fieldwork, IT, and customer-focused. Each of the participants had work-issued and supported Apple iPhone 5C mobile phones operating on iOS 8 software or above. As one of the technologies being examined required a hardware device fitted to the vehicle, that technology was trialed on staff members with access to their own fleet vehicle. There were 28 participants who trialed the hardware technology, with the remaining 76 trialing the technology which was software-based only.

Materials

Phone blocking technologies

There were two technologies assessed in this trial, which will hereafter be referred to as Technology A and Technology B. Technology A was a proprietary software application ('app') that is downloaded onto a mobile phone. Once the software is activated, it relies on the phone's GPS as an internal 'trigger' to activate the software's phone blocking features (blocking calls, texts, app use). Blocking is triggered in this way when the phone is determined to be travelling above a threshold speed (approximately 20 km/h) for at least a minute.

Technology B also requires proprietary software downloaded onto the phone but uses a hardware trigger to activate the software's phone blocking features. This hardware, which was mounted to the windscreen of each participant's vehicle, communicates with the participant's phone via a forced Bluetooth connection. The hardware incorporates both an accelerometer and GPS to detect vehicle motion and once a speed threshold (approximately 20 km/h) is exceeded, it communicates to the phone and software via Bluetooth, activating blocking of the phone equipped with matching software and 'paired' with the device.

Both technologies work on iPhones (in addition to Android based phones), which was important for the project, as the work phones provided to participants by their organisation were all iPhones.

Technology A, when in blocking mode, silences phone calls and SMS texts (although vibration notifications still occur if not specifically disabled). Phone calls can be answered but this is reported as a violation in an associated web-based monitoring portal, and the user is given a written warning on the phone screen. The software thwarts (or 'blocks') phone use by returning the user to the mobile phone's lock screen (with an accompanied written warning on the screen) when any attempt at unlocking the phone occurs. All phone use attempts are reported as violations in the web-based monitoring portal. When in blocking mode, phone calls cannot be made, SMS texts cannot be sent, SMS texts can be received and can appear on the phone screen (if the phone is set to do so), but cannot be answered, and other apps cannot be used (except for permitted navigation software).

Hands free calls can be made using voice recognition ('Siri' on the iPhone). There is an emergency button, which can be used to dial '000'. As Technology A activates blocking on the basis of movement of the phone, it activates on public transport or on a bicycle, or as a passenger in a vehicle. There is a passenger override button that can be accessed and used to remove the blocking once it has commenced. When the phone ceases moving for more than a minute, blocking automatically ceases. This delay in blocking termination is set to avoid phone use during intermittent vehicle stops, such as at traffic lights or during congestion. However, an 'end of drive' button can be accessed to remove blocking immediately after cessation of driving.

If the software is deactivated at any time by 'swiping' it off, a single written warning is given to the phone user and the software remains inactive until it is activated again manually by the user or automatically (with an extended delay) through a function in the software. Software activity or

inactivity is monitored by the web-portal on a central server, which attempts communication with the phone/software on a daily basis.

Technology B only operates when in the presence of a hardware device with which it has been paired. When the app is opened for the first time, it searches for a hardware device using Bluetooth and when it finds one, the person with the phone is asked to authorise pairing. After the initial pairing, the software forces Bluetooth and this cannot be deactivated on the phone unless the software is removed. When in blocking mode, Technology B prevents phone calls from being answered by intercepting incoming calls (sometimes after a one ring delay) and diverting them to message bank. Additionally, the driver receives an audio message on the phone's speaker indicating that a call from a particular number or person has been blocked. A software dispatched SMS text is also sent to the caller notifying them that the person they are calling is driving. In a similar manner to Technology A, Technology B blocks phone use by returning the user to the mobile phone's lock screen (with an accompanied written warning on the screen), when any attempt at unlocking the phone occurs. Hence, phone calls cannot be made, SMS texts can be received and may appear briefly on the phone screen (if the phone is set to do so), but SMS texts cannot be answered and texts cannot be sent.

Music and navigation apps still work but all apps can be blocked if required. There is a passenger override button. If a phone call is made while stationary, the technology also terminates any phone calls once the hardware device and paired phone begin moving in the vehicle. The phone continues to block for around 30 seconds after a drive has ended (again to avoid phone use during intermittent vehicle stops) but there is a 'fast release' button to end blocking immediately after the end of a trip. If the software is deactivated at anytime by 'swiping' it off, a persistent written warning is given to the phone user until the software is re-activated. Phone use attempts are also reported as violations on a web-based monitoring portal, in addition to other driver metrics. There were difficulties in obtaining sufficient Technology B hardware units for the study in a timely manner, so only 28 units were able to be trialed.

Neither app is required to be open and on-screen for their blocking functions to be active; they can run in the background. However, once in blocking mode, the app override features (such as passenger mode or end of trip) can only be accessed by forcing a block (tampering with the phone), and then swiping the warning message presented by the app. A phone power down may require the re-starting of the app.

Questionnaires

Two questionnaires were used for this study: one administered to participants before the phone blocking trial and one administered post-trial. The pre-trial questionnaire consisted of 28 items. The first four items consisted of demographics, items 5 to 13 were concerned with attitudes to use of a mobile phone while driving, items 14 to 21 were concerned with self-reported phone use while driving, and items 22 to 28 were concerned with perceptions regarding the use of phone blocking technology to prevent phone use while driving. All items were scored on a seven point Likert scale from 'Strongly disagree' to 'Strongly agree' (Q 5-13 and 22-28) or from 'Every time I drive' to 'Never' (Q14-21).

Items for attitudes to phone use while driving included references to hand-held and hands-free phone use, sending and reading text messages, and the person themselves versus a 'typical driver'. Sample items are: 'It would be dangerous for me to have a 'hands-free' phone conversation on my mobile phone while driving' (Q5) and 'It is dangerous for a typical driver to send a text message while driving' (Q12). Items for self-reported phone use referred to making and answering calls, and sending and reading text messages, and made a distinction between the use of a work vehicle and the person's own vehicle. Sample items include: 'How often do you answer a phone call while

driving a work vehicle?’ (Q16) and ‘How often do you receive and read a text message while driving your own vehicle for non-work purposes?’ (Q21). Items concerned with phone blocking technology assessed beliefs about its effect on safety and its deleterious effects on work. Sample items include: ‘I think mobile phone blocking technology would make me a safer driver’ (Q23) and ‘I think that not being able to communicate with others using my mobile phone while driving will make work more stressful’ (Q25).

The post-trial questionnaire used a number of items from the pre-trial questionnaire. Items 1 to 13 remained the same (demographics and attitudes to phone use while driving). Items 14 to 21 (self-reported phone use while driving) remained the same but asked about behaviour during the phone blocking trial. A sample item is: ‘How often during the trial did you answer a phone call while driving a work vehicle?’ (Q16). Items 22 to 28 (beliefs about phone blocking technology) also remained but were reframed in terms of experiences of the technology during the trial. A sample item is: ‘The phone blocking technology I experienced during the trial made me a safer driver’ (Q23). Additional items asked about other aspects of the experience of the phone blocking technology. Examples included ‘I was able to override the phone blocking technology when I needed to’ (Q34), ‘I was prevented from using my mobile phone by the technology when I should not have been’ (Q36) and ‘the phone blocking technology depleted my phone battery to a degree that caused me inconvenience’ (Q38). Finally, participants were invited to give the technology a rating on a scale of 0 (very poor) to excellent (10) and to make their own free text comments at the end about the technology they trialed.

Procedure

The organisation assisting us with the project set up recruitment sessions at their head office and metropolitan branches around Adelaide. A CASR project team member delivered a presentation about the trial and the two technologies. Those interested in being involved were provided with a consent form, information sheet and the pre-trial paper-based questionnaire and reply paid return envelope. Instructions were given on how to download and activate Technology A. Technology B required drivers with access to their own company car rather than a pool vehicle, and so specific staff members were invited to information sessions about Technology B. Those interested were given a hardware device, paired to their own phone, to install in their vehicle. Instructions were given for how to install the device.

During the recruitment sessions participants were told that the technologies would be operational 24 hours a day on weekdays only, and would not be operational on weekends. Also during these sessions, a discussion on what to expect from each of the blocking technologies was supplemented with example videos that demonstrated how the particular technology should work on their phones under different driving scenarios. This included what to expect with incoming call/text scenarios and attempts to make calls/texts while driving, and how to use passenger mode/end of trip mode. Additionally, information sheets re-iterating some of the presented information (including operating hours), and information sheets relating to the specific technologies from the technology providers were also distributed.

The trial lasted in each case for one month (November 2015). As the technologies were set only to block phones on weekdays, this gave a maximum of 22 days of blocking. Phones were blocked for the full 24 hours on these days. After the month long trial ended, invitations to complete an online (Survey Monkey) post-trial survey were sent to participants’ email addresses. All participants who completed both the pre- and post-trial questionnaires were entered into a draw to win an iPad.

During the blocking trial it was noted within the web administration portal that a number of users of Technology A were de-activating the software (by swiping it off or tampering with various phone location service settings). Bulk e-mail and SMS text reminders were sent to those users on three occasions reminding participants to keep the software active and not swipe it off.

Analysis

Responses to the questionnaire were compared for the two groups of participants who experienced the two different technologies. For responses to individual items scored on Likert scales, comparisons were made using Chi-square tests. Responses to questions about attitudes to phone use while driving and the phone blocking technology, and self-reported phone use while driving were summed, and the resulting variables were compared using Repeated Measures Analysis of Variance, with Time (pre-and post-trial) treated as a Within-Subjects factor, and the Technology trialed treated as a Between-Subjects factor.

Results

Overall experiences

When asked if they had experienced phone blocking while driving, 53 participants trialing Technology A (69.7%) and all 28 participants trialing Technology B stated that they had. When asked if the technology had worked reliably, 15 participants (19.7%) stated that Technology A blocked the phone ‘every time’, compared to 47.8% for Technology B.

Table 1 shows that a minority of users of Technology A strongly agreed or agreed that it worked as it was supposed to, that they were able to override it when they should have been able to, that they were able to use their phone as a passenger, that it prevented phone use when it should not have, that they were satisfied with the technology’s performance, and that it depleted the phone’s battery. Chi square tests indicated that users of Technology B were significantly more likely to strongly agree or agree that the technology they trialed worked as it was supposed to, depleted the battery, and performed satisfactorily ($p < .001$).

Table 1. Participant experiences of the two phone blocking technologies

	Technology A (n=76)	Technology B (n=28)
	% Strongly Agree or Agree	
Worked as it was supposed to	33.3	78.6
Able to override	17.3	17.9
Able to use phone as a passenger	40.0	21.4
Prevented phone use when it should not have	42.7	22.2
Satisfied with performance of the technology	29.7	66.7
Depleted the phone battery	35.1	85.7

Similar proportions of participants reported frequently having trouble with accessing their phones at the end of the drive (19.7% for Technology A and 17.9% for Technology B). When asked if they would recommend the technology they trialed as a method of blocking phone use while driving, 60.5% of participants said ‘yes’ for Technology A and 64.3% of participants said ‘yes’ for Technology B.

When asked to rate the technology they trialed on a scale from 0 (very poor) to 10 (excellent), based on their overall experience with it, the average ratings were 5.5 ($SD=2.7$) for Technology A and 6.8 ($SD=2.0$) for Technology B. The difference in the two ratings was found to be statistically significant ($t_{(64.8)}=2.57, p<.05$).

Effects on attitudes and behaviour

Table 2 shows participant responses to items regarding attitudes to using a phone while driving and attitudes to phone blocking, before the trial and after having experienced the phone blocking technologies. Participants generally regarded sending and reading text messages and making hand held phone calls while driving as dangerous, while hands free phone calls were less likely to be regarded as dangerous. There appeared to be a tendency for participants to view phone use while driving as marginally more dangerous for the ‘typical driver’ than for themselves. Ratings of the danger of phone use while driving remained high after the trial. There was a reduction, as indicated by paired samples t tests performed on the entire sample, in the belief that phone blocking was a good idea for themselves ($t_{(103)}=3.4, p<.01$) or for the typical driver ($t_{(103)}=3.9, p<.001$).

Participants were unsure about the benefits of phone blocking before the trial but did not foresee a high likelihood of interference with necessary work tasks or communication. A minority thought it would make them a safer driver. After experiencing phone blocking, participants were more likely to indicate that phone blocking would have negative effects on their work (sum of the items referring to interference with work, tasks being more difficult, work being more stressful, and communication being prevented) ($F_{(1)} = 8.5, p<.01$) and were less likely to think phone blocking would have positive effects (sum of items referring to improvements in safety and being worthy of consideration for their own vehicle) ($F_{(1)}=19.4, p<.001$). There were no differences in the extent to which attitudes changes for the two different technologies.

Table 3 shows self-reported phone use while driving among the participants. Participants reported low levels of phone use, and were especially unlikely to report sending text messages while driving. A repeated measures analysis of variance found that overall phone use while driving reduced during the trial phase compared to beforehand ($F(1)=62.2, p<.001$) but that there was no differential effect according to the type of phone blocking technology experienced.

Table 2. Participant attitudes in regard to phone use while driving and phone blocking technology

	Technology A (n=76)		Technology B (n=28)	
	% Strongly Agree or Agree			
	Pre-trial	Post-trial	Pre-trial	Post-trial
Dangerous for me to make hands free call when driving	33.3	30.3	28.6	28.6
Dangerous for me to make hand held call when driving	90.7	90.8	89.3	92.9
Dangerous for me to send a text when driving	97.3	98.7	100.0	100.0
Dangerous for me to read a text when driving	96.0	90.8	89.3	100.0
Good idea to use phone blocking when driving a work vehicle	57.9	43.2	53.6	57.1
Dangerous for typical driver to make hands free call when driving	45.3	50.0	39.3	50.0
Dangerous for typical driver to make hand held call when driving	94.7	96.1	88.9	100.0

Dangerous for typical driver to send a text when driving	100.0	98.7	100.0	100.0
Good idea for a typical driver to use phone blocking when driving	61.8	46.1	60.7	60.7
Phone blocking would interfere with work	15.8	32.9	10.7	21.4
Phone blocking would make you a safer driver in your work vehicle	39.5	21.1	42.9	32.1
Phone blocking would make work tasks more difficult	23.7	38.7	10.7	17.9
Phone blocking would makes work more stressful	9.2	22.7	7.1	7.1
Phone blocking would prevent important communication	19.7	28.0	14.3	32.1
Phone blocking would make you a safer driver in your personal vehicle	41.9	21.3	44.4	35.7
Would consider phone blocking in my own vehicle	32.4	20.0	40.7	35.7

Table 3. Participant self-reported behaviour in regard to phone use while driving

	Technology A (n=76)		Technology B (n=28)	
	% Never or Rarely			
Items	Pre-trial	Post-trial	Pre-trial	Post-trial
Frequency make phone call in work vehicle	76.3	88.0	53.6	89.3
Frequency make phone call in own vehicle	60.0	75.0	42.9	78.6
Frequency answering phone in work vehicle	70.7	82.9	42.9	89.3
Frequency answering phone in own vehicle	48.7	68.4	21.4	67.9
Frequency send text in work vehicle	97.4	100.0	89.3	92.9
Frequency send text in own vehicle	89.5	96.1	85.7	92.9
Frequency read text in work vehicle	88.2	96.0	75.0	89.3
Frequency read text in own vehicle	72.4	89.5	67.9	89.3

Discussion

The study of the performance of two phone blocking technologies using a sample of drivers of corporate vehicles produced mixed results, with reports of poor performance by the two technologies, no change in attitudes regarding the dangers of phone use while driving following the trial, but a statistically significant reduction in self-reported phone use during the trial.

Performance

Participants generally gave a negative appraisal of the two technologies, especially Technology A, which was the software only phone blocking product. Approximately 30 percent of participants reported not even experiencing phone blocking with Technology A, and only 20 percent said that it worked reliably every time. In some cases it is possible that the technologies were perceived not to have worked because participants did not actually have any calls made to them or texts sent to them by anyone. However, Technology A would occasionally cause the phone to vibrate and present an on-screen warning in the normal course of driving when the technology was active, regardless of whether a phone call/text being received.

Interestingly, despite its inability on many occasions to block the phone, over 40 percent of participants also agreed or strongly agreed that it prevented phone use when it should not have done. There were also problems with accessing the phone at the end of a drive. Not surprisingly, only 30 percent reported that they were satisfied with its performance.

Technology B, which involved software paired with a hardware device mounted in the vehicle, received a more favourable appraisal than Technology A but participants still reported that they had difficulties overriding it when required and that it sometimes prevented phone use when seated in the vehicle as a passenger. Significantly more participants reported experiencing issues with phone battery depletion with Technology B (85.7%) compared to those participants using Technology A (35.1%). Despite these problems, around two thirds of the participants were satisfied with the performance of Technology B and the rating they gave the technology on a scale from 0 to 10 was significantly higher than Technology A. Interestingly, they were not more likely to recommend it as a method for preventing phone use while driving than the participants asked about Technology A.

On the basis of the above, it appears that some improvement is needed in the reliability and usability of both products. However, negative opinions regarding the reliability of Technology A may have been influenced by the software not performing as was expected by the participants. That is, it didn't block when they expected it to and it did block when it was not expected. This may be because quite a few participants habitually 'swiped' off the software, possibly turned off location services (required for triggering) or turned off WiFi, possibly deleted the app, or due software glitches (blocking when not supposed to). This was despite our reminders to keep the software active (see the 'Limitations' section below). The perceived failure of the phone blocking occurring in these cases was therefore due to the software likely being inactive or due to genuine software failures. This was not such an issue with Technology B as the software itself provided persistent reminders to re-activate the software if a participant swiped it off and the software activation occurred through an external trigger.

The issue of battery depletion is difficult to address when the software requires constant monitoring of phone location (to determine phone speed to trigger blocking as required for Technology A). However, in the case of Technology B, 'location services' was not required to trigger phone blocking and was only used for collecting driver metrics, offered in this case as an additional service by the technology provider, so battery depletion may be easier to address for Technology B.

Based on the opinions of the participants, improvements to the technologies need to be made in terms of both blocking phones when they should and not blocking them when they should not. Aside from situations in which the software has been swiped off, blocking failures can occur for a number of reasons, including problems with the phone's internal GPS, problems with WiFi, software 'bugs', upgrades to the phone's operating system, and software incompatibility. Override functions also need to improve, especially in terms of usability.

Effects on attitudes

Participants generally held negative attitudes to phone use while driving before the trial, with a large proportion recognising the risks of hand held phone calls, and sending and reading text messages while driving. This might be due to their recruitment from a corporation with a strong safety culture, including a strong driving safety culture. A lower proportion of participants viewed hands free phone use as dangerous, which may be because use of hands-free is legal (under a full drivers licence). The technology trialed in this study permitted hands free phone use at the request of the corporation but only so people were aware when their phone was ringing, so that they could pull over and answer it. The corporation's phone policy does not permit hands free phone use while driving.

One outcome of this clear recognition of the dangers of phone use while driving was that it was difficult to detect any increase in the recognition of risk following the trial. The only items concerned with phone use attitudes which did demonstrate an effect were those related to phone blocking technology being a ‘good idea’: support for this idea dropped significantly following the trial, no doubt reflecting the negative experiences many participants had with the technologies.

In regard to other items enquiring about attitudes to phone blocking, there were indications that the trial had resulted in a more negative attitude to phone blocking technology as a viable method of reducing phone use while driving in an occupational setting. Following the trial, participants were more likely to indicate that phone blocking would negatively affect work and were less likely to think phone blocking would improve safety or be worth considering for their own vehicle. This was the case regardless of whether the participants had trialed Technology A or Technology B. Again, this demonstrates the effect of negative experiences with the phone blocking products assessed in the study.

Effects on behaviour

In keeping with the generally negative attitudes to phone use while driving, there were low levels of self-reported phone use even before the phone blocking trial had commenced. Around 90 percent of participants reported never or rarely sending a text message while driving. Despite the low baseline rate of phone use while driving, the phone blocking trial did result in reductions in this behaviour. There were increases during the phone blocking trial in the likelihood of participants ‘rarely’ or ‘never’ making or answering calls, or reading text messages. This was seen regardless of which technology was trialed. As those using Technology B would only get their phones blocked in work vehicles, it is interesting to note an apparent effect on behaviour also when driving their own vehicles, suggesting the possibility of a transferability of the effect on behaviour into other contexts.

It should be noted that, while the purpose of this study was to examine the effectiveness and acceptability of mobile phone blocking technology among drivers, the two technologies also allow the monitoring of an organisation’s mobile phone policy compliance through their respective web-portals. Organisations utilising either of these technologies can attempt to prevent mobile phone use by using the blocking capabilities of the technologies but can also monitor any non-compliance. Individuals can then be counseled if non-compliance is reported.

Limitations

The sample recruited for the study was based at an organisation with a strong safety culture in which phone use while driving was actively discouraged. Part-way through the project development phase, the organisation enacted a work health and safety directive banning all mobile phone use (including hand-free) while driving on company time or driving a company vehicle. This is likely to have contributed to most participants having negative attitudes to phone use while driving and only rarely engaging in such activities, even before the trial. This would have made it difficult in this trial to detect a positive effect of phone blocking technology. Nonetheless, statistically significant changes in self-reported behaviour were detected.

Also, difficulties with obtaining sufficient units of hardware for Technology B meant that only a small sample was available to assess that product. However, the sample for Technology B was of sufficient size to demonstrate statistically significant differences to Technology A on a number of measures.

Another limitation is that Technology B required participants with access to their own fleet vehicle, rather than using pool vehicles, meaning that the participant groups assessing the two technologies

were likely to be different. However, patterns of responses on the pre-trial questionnaire were very similar.

Finally, it was easy to ‘swipe off’ or deactivate the software for Technology A and most participants did this at some stage during the trial. In fact, only one participant had phone blocking software operating for all 22 days of the trial. CASR staff were aware of who had deactivated the software from their phone and would contact participants to remind them to re-activate it. In total, only 22 participants had the software operating for 11 days or more, 40 people had the software operational for 1 to 10 days, and 14 people appear to have used Technology A for less than one day. This may partly explain why a large proportion of participants reported not even experiencing phone blocking with Technology A or that it did not work reliably every time. Although this is problematic, it is also important to recognise that in a field trial such as this, one is interested in examining what people actually do, and it is apparent that many people will either deliberately or accidentally swipe off or deactivate the software and render it inactive.

Conclusions

The results of this trial suggest that phone blocking products may provide a useful method of changing mobile phone use behaviour while driving. However, the products, whether they be software only or software combined with hardware, need to improve to reach higher ratings of user acceptance and approval. A number of issues with the operation of the two technologies were identified in this trial which will need to be addressed in order to support a recommendation for wider implementation or promotion of phone blocking as a countermeasure for phone use while driving.

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