

Why don't telephones have off switches?

Understanding the use of everyday technologies

A research note

Unlike other technologies, the telephone is unusual in that it cannot be 'turned off'. Almost uniquely, its design does not incorporate an off switch, or when it does, it tends to be located in an inaccessible position (such as on the underside of the phone). Rather than arguing that this is a special feature of telephones, this paper argues that this is an example of designers seeing rules as generators of action, rather than *resources* for action. That is, a rule of phone behaviour is "when a phone rings, answer it". However, rules do not simply generate action. We can choose when not to follow it. Support for this case has been neglected by designers, forcing individuals to appropriate other technologies to support not answering the phone. These rules of use are implicit in how we conceptualise the use of technology, and in turn, how we perform design. We suggest that designers can be aided by understanding better the nature of rule following, allowing them to design technology that supports 'deviant', yet equally valid modes of use.

Keywords: Rules, innovation design, technology use, user appropriation, information appliances.

The authors have long shared an interest in the telephone as a ubiquitous, everyday technology. The telephone is a central part of the way we conduct our lives, but perhaps surprisingly, there have been few investigations into its use from a non-technical standpoint¹. It is as if the telephones' very ubiquity makes it invisible when compared to the investigation of more esoteric and advanced technologies. We do not need to emphasise the importance of the telephone in everyday communication, yet its simplicity of design and operation does not imply a simplicity of use. Particularly with the introduction of new telephone services there is opportunity for innovation in telephone use and design.

To make a wider point, to ignore "simple" technologies is to commit a grave mistake. For, as some writers have argued, technology appears to be moving to increasingly single task devices: "information appliances", as they have come to be known. Raskin (in Nielson, 1988) defines these information appliances as small systems primarily intended to perform a single task. To better design these information appliances it is important that we understand something of how simple devices are used in context. The last ten years have seen a growing interest in studies examining the use of technology in its context of use. Laboratory experiments studying decontextualised situations of use have been

¹ A notable exception to this is Ithiel de Sola Pool's collection of papers (1977)

critically evaluated and seen to be lacking, because of their neglect of contextual factors in action (Winograd and Flores 1986; Suchman 1987), and their lack of ecological validity (Neisser, 1967). Within HCI, and particularly in the associated field of computer supported co-operative work (CSCW), this realisation has resulted in a gradual move away from lab settings, to investigations of technology use “in the wild”. In particular, findings from field studies of workplaces have contributed to our understanding of technology (Nardi and Miller 1990; Heath, Jirotko et al. 1993; Rouncefield, Hughes et al. 1994; Randall and Hughes 1995; Orr 1996). These studies show that technology use is not a simple solitary activity, but a complex process of collaboration and interaction between multiple individuals and media. Field studies have allowed analysts to explore these contexts of technology use in a way that experimental studies do not, showing that the nature of technology use is not as simple as it may initially appear.

In this paper we use observations of technology from field studies to argue for a novel way of conceptualise the use of technology, and show how this concept can benefit designers. Using examples drawing from and informed by a range of studies into office based and mobile communications, we discuss the humble telephone. The telephone exposes the nature of the *rules* we use in orienting to our world. That is to say, telephones have been designed to support the simple *rule following* behaviour of “phone rings -> answer phone”. Rethinking this as *orienting towards a rule* has the potential to develop more effective designs that support actual, rather than expected patterns of use. With regard to the phone, fieldwork shows that technology users have already done this, by appropriating two other technologies - “Caller ID” and “Voice Mail” - to support *not* answering the phone.

The telephone in use

The title of this paper poses a question regarding the design of the telephone. Most of us, at one time or another, have not answered the telephone when it has rung. Perhaps we are preoccupied, or are avoiding someone who might be calling. Not answering the phone is a fairly simple activity, and one that at first glance it would seem sensible to support with the addition of a ‘ringer off’ button. Certainly, this is something which is technically trivial to implement, but which few ‘normal’ telephones support. On the one phone we found which did have a ringer off facility, this involved turning the body unit upside down, even though the front of the phone had buttons for more esoteric features, such as timers and a clock. Compare this with most other household devices, where the off switches are in prominent positions. A telephone, it seems, is designed to be always active; but what makes it so different?

Connected to this puzzle are the advertisements that were recently running in the UK for a large British telecommunications organisation’s “Caller ID” service. This service offers, on purchase of a suitable phone, the ability to see who is calling before the handset is picked up. However, rather than advertise it on the basis of perhaps its most obvious use - to screen calls - the advertisement instead says: “Wouldn’t it be nice to know who’s calling before you pick up the phone?”. On this basis, Caller ID appears to be a rather expensive service for establishing what can, after all, be asserted as soon as the

caller answers. Of course, Caller ID is intended to be used in screening (perhaps abusive) calls where it is useful to check the callers identity, but the organisation chose not to say this. In a similar way, advertisements for answering machines invariably emphasise how they can prevent messages being missed - rather than their use to screen incoming calls. The common activity of not answering the phone seems to be one with a certain taboo — at least in the UK. Telephones are not designed to support this, and those devices that can be appropriated for this purpose are advertised for their other features. Even the age old trick of leaving the phone “off the hook” now results in a recorded message to “replace the handset”.

Appropriating telephones

We do not intend to probe any psychological reasons why it is so difficult not to answer the telephone. Rather we intend to highlight issues relating to the relationship between the design of a particular technology and its use in everyday settings. Despite telephone companies attempts to push consumers into purchasing devices to make them more and more accessible, there appears to be a reluctance by people to make themselves permanently available. They may not have the option of switching off the telephone, for both organisational as well as technological reasons, but they have developed a number of strategies that allow them to reduce their obligation to answer the telephone. Over the last few years we have been involved in extensive studies of communication and mobile communication (e.g. Perry and Sanderson 1998; Brown 1998; O'Hara *et al*, in submission), and these have informed our views on telephone use. An example from three months of field work conducted by the first author demonstrates the ingenuity of some people in *not* answering the phone.

In the organisation studied, a fairly advanced telephone system had been installed. This system had both Caller ID (showing the caller's telephone number) and Voice Mail (a personalised, electronic telephone answering service). Although somewhat incidental to the original purpose of the fieldwork, it was observed that in interviews, meetings, or even just incidental chats, the ringing telephone would spark an unusual bit of behaviour:

Rather than the usual procedure of answering the phone, the receiver of the call would turn, glance at his or her phone, and then either answer or ignore it. Moreover, in most cases the phone would be ignored rather than answered, with the call being automatically redirected onto the recipient's Voice Mail. However, in other organisations studied (without these more advanced phones) calls would be answered and an arrangement made to speak later.

A clue to what is happening here is given by one incident. An accounts clerk was being interviewed, and the phone ring resulting in the by now usual 'glance and then ignore' pattern. When the phone rang again for a second time almost immediately afterwards, she picked up the handset:

“hi... yeah,.. I saw that you'd called twice, so I thought I better answer it”

In ignoring the call, the account clerk had checked to see the number of the caller. On the second call, she had realised that the caller had rung again and had ascertained that it must be about an important matter (since they had called twice). The “glance then ignore” procedure appears to involve the receiver checking the caller’s number as a clue to the importance of the message, and then making a decision about whether it is important enough to answer, or leave to the Voice Mail. Interestingly, the caller is also aware of this behaviour — she calls twice, knowing that she may have been actively ignored on her first attempt.

Since Caller ID and Voice Mail are technologies that have different histories and development, we can assume that this combination was not one specifically ‘designed for’ by telephone designers. However, whilst this serendipitous combination of Caller ID and Voice Mail is presumably accidental, together they provide excellent support for not answering the phone. In this instance, Voice Mail abated the rudeness of not answering a call by offering a facility to continue the communication asynchronously, without a direct connection. Since nearly everyone at the field site continually checked their Voice Mail, callers aware of this behaviour could be sure that their messages would get through fairly soon. This made not answering the call a less reprehensible action. Caller ID, on the other hand, provided recipients with information to support *the option* of answering the phone, rather than a compulsion to do so. With Caller ID, important callers (or those who could not be dealt with through Voice Mail) could be answered immediately, whilst passing calls off which could be dealt with at a more convenient time.

The development of communication devices has increased connection through various technologies to include answering machines, mobile phones, pagers, faxes and email, and so on. These have all been designed to facilitate an *increased* level of connection and communication. What the designers of this increased communication appear to have ignored, however, is the need for more *appropriate* communication. In the case of the combination of Caller ID and Voice Mail, these technologies were appropriated by their users to support not answering a ringing phone - an important facility for busy office staff when they did not want to be disturbed. Other technological solutions have been suggested to similar problems: Nielson (1997) suggests a situation in which software agents could negotiate whether a call should be allowed to be connected depending on the caller’s urgency and level of prominence to the recipient.

Whilst recent technological advances have been appropriated to make ‘not answering the phone’ possible, this is not to say that the artful avoiding of telephone calls is something new. In the past, secretaries were (and on occasion, they still are) commonly used to answer calls when people did not wish to take them directly². This was a mechanism adopted to avoid answering the telephone, and one

² The difference of course, lies in the word ‘directly’: the call is accepted and a reply could be given (by the secretary), or a message left. In this case, the rule is bent more than it is broken as the telephone is answered, although not by the intended recipient. Many callers recognise and accept this, although some have reported being confused when they directly connect to the recipient unexpectedly.

that these recent telephone technologies appear to have superseded effectively. Indeed, perhaps because of the changing role of traditional secretarial work, we cannot now rely other people to answer our calls for us, leaving a niche to be filled by technology. On the other hand, it may be because of these technologies that the role of the secretary has changed. Whatever the case, not answering the phone is deemed to be important enough to have been consciously considered by its users.

Of course, a common exception to the lack of off switch is the mobile telephone. The advent, adoption and use of mobile telephones is a great popular and media topic, and much has been made of its increasing ubiquity, its role in changing work patterns and as a social nuisance. Historically, with the limited battery life of these phones, an off switch was essential. Consequently, these phones *do* have an off-switch prominently visible on their front surface.

Mobile telephones commonly have Voice Mail and Caller ID features. As with our office bound telephone users, these features have been appropriated in a similar way to that described in the fieldwork example. Voice Mail and Caller ID helps to alleviate the rudeness of not answering a call, something essential when a phone will commonly be switched off. Indeed, the role of the off-switch has changed from a power conservation button to a connectivity controller. In terms of incoming calls, results from further studies we have conducted suggest that mobile phones are used as asynchronous receive tools – with the mobile phone used to retrieve Voice Mail messages sent by others (O'Hara *et al*, in submission). This has changed the use of the mobile phone in receiving messages to more closely resemble email.

Normative rules: Rule following and rule orientation

We suggest that the problems in not supporting particular forms of use inherent in the design of the telephone can be better understood as a *misunderstanding* about rules and behaviour by its designers. To explain this we will start by discussing something of the nature of rules in behaviour, and then show how this explains the lack of off switches on telephones.

As has been demonstrated in a number of studies, **rules are oriented to in our behaviour** rather than followed exactly (Bittner 1967; Wieder 1971; Suchman 1983; Bowers). That is, rules are resources for action, rather than generators of action. An example of this can be seen in the road safety rules. The rules of driving on the correct side of the road helps to make driving more orderly, but it does not *determine* where one drives. The rule is oriented to and used as a resource, but it does not determine our behaviour completely, and we may choose to break if appropriate. So while we are aware of a rule, and it influences our behaviour, we are not bound to follow it, and if we do, we do not follow it programmatically.

We also make use of rules in how we understand other people's behaviour. So, for example, a driver indicating and then turning makes sense because we are aware of the highway rule being used by the driver. So rules are both used to guide our own actions, as well as in understanding the actions of others. This is illustrated in Hutchins and Tore's (1996) discussion of an interaction between an aircraft

pilot and air traffic control (ATC). In a transcript of this interaction, there is one incident where the pilot fails to repeat a request from air traffic control (a standard practice for requests from ATC). This prompts the second officer to intervene and clarify the request to the captain, which the captain then repeats to ATC. Hutchins and Tore describe this as the ‘violation of expectations’. However, this point about the visibility of the unexpected response also makes sense in terms of orientating to, but not following, a rule. Where the pilot does not respond, he is *visibly* not responding because he is breaking a rule of conduct - “ATC request -> repeat request as confirmation”.

Likewise, when we watch someone not answering a ringing phone, their behaviour is understood as breaking the rule of conduct – visibly not answering the phone. In this way rules are an important part of our actions and our understanding of others actions. Like anyone, designers use rules to understand and conceptualise user’s behaviour. For example, behaviour around ringing telephones has been seen as following the rule “phone rings -> answer it”. However, users orientate to this rule, and are not bound to follow it. So while designers are right to use the rule to understand behaviour (as any ordinary person would), they are wrong to see this rule as *generating* behaviour. Telephones should better supported not answering the phone. Indeed, with Caller ID and Voice mail users have themselves appropriated these technologies to support not answering the phone. It is not that designers have explicitly designed phones using rules, but rather that they have understood action around phones using this rule, as anyone does.

This discussion is something of a simplification of a point originally made by Garfinkel and Sacks³. They argued that ordinary everyday actions involve the use of rules that to make our behaviour understandable to others. That is, we make use of “structures of action” in what we do, so that other people can understand what we are trying to do. These structures and rules are used as resources in that they flexibly describe how to act so that our behaviour makes sense to other people and appears purposeful. More recently, it has been discussed with relevance to technology in Suchman’s remarks in her work on plans as resources for action (Suchman 1987), in disputes over rules in the design of speech based systems (Button 1990; Frohlich and Luff 1990; Button, Coulter et al. 1995; Button and Sharrock 1995; Fordham and Gilbert 1995), and in a critique of Winnograd’s use of speech-act theory (Suchman 1994; Winograd 1994).

We suggest that this neglect in considering the flexibility of rule use in product design may have grown out of the use of non-naturalistic and in particular, laboratory based experimental studies of behaviour in HCI. One of the well-documented failings of laboratory studies is that they fail to deal with the “situatedness” of activity. Inherent within this is the problem that laboratory studies overemphasise the role of rule following in behaviour. Since laboratory studies involve control over the possible range of behaviours, deviant actions are unlikely to occur, or if they are, to be documented. Memory experiments are an example of this, in which people are asked to remember sequences of numbers. In

³ A detailed discussion of this point can be found in Heritage (1984) and Lynch (1993).

general subjects attempt to do so. Were the subjects to fail in following the experimental procedures, they would be removed from the data set. However, in real world situations, such behaviour is likely to be more complicated. People have multiple concerns and demands made on them and they flexibly adapt to their situation and environment.

By attending only to controlled experimental situations, deviant behaviour is unlikely to be supported in product design. Designs based on the findings of laboratory studies restrict the consideration of the use of technology to the usual, straightforward sequence of events, such as answering a phone when it rings. Whilst in many cases, limitations on the range of possible behaviours are necessary, rethinking this concern can be productive for design. This is particularly the case for the design of devices that are explicitly used in communication, such as the telephone, and more recently, CSCW technologies.

A device for design: Design innovation and understanding use

Rather than offer a corrective, and criticising current design practice, we would like to suggest that rethinking rules is instead an *opportunity* for opening up a discussion on technology design through its practices of use. In conventional design situations, the implicitly held ideas about normative rules allow designers to restrict the scope of the design (“the design space”), and thus reduce the complexity of their problem to manageable proportions. However, by ignoring the situations where rules are not followed, we lose the ability to design for them. Rethinking our conceptions of rule-based use can be used to inspire new design ideas, and to understand the use of technology in a less restrictive conceptual framework.

But what does our understanding about orientation towards rules mean for design practice? Whilst designers may not explicitly formalise the rules of user behaviour, they also use rules to understand the behaviour of their users. Designers of telephones do not worry about ringing behaviour because it is seen as a simple case of rule following. However, as argued above, users orientate to the ‘answering phone’ rule, and sometimes do not want to answer the phone. This eventuality could have been designed for if the designers had conceptualised use in this way.

By making the rules of use visible, we have the potential to expose the limitations of current technology, and to develop design solutions that do not restrict use to the ‘normal’ case of action. This heuristic is particularly relevant in the design of information appliances (Norman, 1998), since their functionality is more limited than in traditional computer software. In our experience, rethinking rules as a device has proven to be an original and useful technique for generating potential innovations on existing devices, or for grounding the discussion of the use of more innovative appliances. We have made use of this heuristic in our own work in circumstances when we wish to make sense of users activities so as to be able to better design for them.

An example from our recent work on handheld scanners elaborates on this point. This point is intended to illustrate the use of the principle in design, so we will refrain from describing the technology in detail. The “Capshare” hand held scanner is an untethered appliance that can be used to scan and store

fifty A4 or U.S. letter-sized pages. It works by being dragged across a page in a swipe motion. The designers of Capshare originally assumed that the users would keep the device on the page while scanning. This is rule of use: “while scanning -> keep scanner on page”. However users discovered that they could get better scans by dragging the device straight off the bottom of the page. Unfortunately, since the designers had assumed that the users would follow the scanning rule, the device would then give an error message. This use makes sense when we understand it as a case of rule orientation. Users were aware of the fact that they were meant to keep the device on the page, but they decided to break the rule when it would get them better results. Redesigning the interface to the technology so that the unnecessary and potentially confusing error message did not appear was a simple design solution that supported this rule breaking.

An additional study conducted by the second author looking into the use of mobile technology in construction also demonstrates the utility of this viewpoint. In this site it had been proposed that mobile phones could replace the use of walkie-talkies. Looking at the data, and considering the use of rules highlights why this would have been a failure. During the fieldwork, it was observed that hand held radios (walkie-talkies) were regularly used for communication between engineers and site workers. Walkie-talkies are specifically designed for two way communication. Like telephones, individuals use them to communicate with each other:

Site engineer: <Radioing from site office to the site> ‘15 to 17. Come in.’

Foreman: ‘What you want?’

Site engineer: ‘Have you seen Florida Phil?’

Foreman: ‘Hello? Having trouble receiving you.’

Site engineer: <repeats slowly> ‘Have you seen Florida Phil?’

Foreman: ‘Nah mate. He was here earlier.’

Site engineer: ‘OK then. See ya later.’

Foreman: ‘I can get him to call you if I see him’

Site engineer: ‘You do that. Ta mate.’

Here, the fieldwork demonstrates how closely the radio conversation mirrors that on a telephone: the call sign is interpreted and answered in a similar way to that of the ringing telephone. In this case, a normative rule of use was followed. Someone speaks your call sign and you answer. This is the straightforward use of a walkie-talkie - the rule of receiving a message is “On hearing call sign -> recipient replies”. From this analysis we might think that using walkie-talkies is ineffective, or that they are a poor technological solution to a communication problem. After all, you cannot have more than one conversation taking place simultaneously without interference. So, to replace the walkie-talkies we could suggest the use of mobile phones. With the number of each phone programmed into the phone’s auto-dial this could turn out to be a cheaper and more effective design solution than custom-built walkie-talkie systems.

However, as anyone who has used a walkie-talkie will know, simply looking at the walkie-talkie in these limited terms fails to take account of how its design impacts on actual *use*. The mistake lies in reducing the design of the device to that of a point-to-point communication tool. Radios are not used simply in this capacity; they can be constantly left on, and this means that they can also be used for overhearing conversation by non-participants. Like an open plan office, which allows overhearing or “surreptitious monitoring” (Heath and Luff 1992) of conversations, the radios allowed staff to overhear each others conversations. In this way, the rule of use with call signs can be ignored as one person breaks into someone else’s conversation. Walkie-talkies therefore support the breaking of this rule of use. From field notes again:

Someone on-site (A) is talking on the radio, making a request to another person on-site (B) for some guard rail, which they had run out of:

A: “We’re going to need some rail if you’ve found some”.

This radio conversation is overheard in the site office by an engineer (C), who knows that another engineer (D) in the office has recently contacted a guard rail supplier.

C: <cuts into the radio conversation> “What’s that, you want some rail?”

C joins the now three way radio conversation. He finally gets a specification for the guard rail, which he passes on to the engineer (D) in contact with the supplier.

In this situation, the rule of normative use was broken, since no call signs were exchanged - C just broke into the conversation. This was possible because the technology supported rule breaking, permitting a more flexible use of the system. Although this ‘listening in’ did not fit into the standard pattern of use, it was useful for those concerned. As a device for communication, the radio had been appropriated by the construction workers by deliberately breaking the rules of its use. This sort of scenario could have been forecast if we were to think about how rules of use are oriented to, and how they sometimes will be broken. By conceptualising of use as “rule orientation”, we gain a richer understanding of how technology is actually used. This is a significant resource for design - because it can inspire support for situations of use that would otherwise be ignored.

There are other possible reasons for the design of the telephone not including an off-switch, but we do not attempt to follow these up here. Looking for the *official* history of a design can be highly elusive and contradictory (see Latour 1996). We offer the telephone’s lack of an off switch, not as a study of how the design was done, but as an illustrative case around which to think about design and how technology is used. The fact is that telephones do not have an off switch, but that users appear to require some way of not answering the phone.

The approach here partially resonates with Button and Dourish’s approach in their paper on ‘technomethodology’ (1996). In this paper, the authors argue that design process can be informed by a deeper understanding of the principles of ethnomethodology, rather than its understanding of particular

situations. While we do not subscribe to their methodological or theoretical programme, we use a similar technique here in that we make use of ethnomethodological principles regarding the use of rules in design situations. It is not the analysis of a particular rule use situation, but rather a general feature of rule following that we appropriate for design purposes. Understanding the rule use in this way can help to prevent costly mistakes in the design and implementation of technology.

By exposing the implicit rules that designers use in understanding technology use, designers can explore how their design solutions constrain use (as with the phone) or provide opportunities for artful use of that device (as with the radio example). Perhaps because they are seen as trivial, ‘simple’ artefacts like telephones are rarely considered as objects worthy of discussion from a usability perspective. However, looking at a simple technology has here allowed us to better understand a design issue. We offer reconsidering rule use as a simple heuristic to perform better design.

Conclusion

The history of development of communication devices has been one of increased connection. But as we have argued here, a more important concern is that of appropriate communication. For that, it is necessary to support patterns of use other than the normal ways that telephones are used. From fieldwork data, we have shown how with the combination of Caller ID and Voice Mail, technology was appropriated by its users to support *not* answering a ringing telephone. In combination these technologies are used to reform what is the normal course of action with a ringing phone, making it acceptable behaviour to not answer an incoming call. The example of the radio in a second fieldwork example showed how another, similar technology did support rule breaking through its appropriation by users in an unexpected, but effective way.

Our analysis has attempted to make explicit one way in which designers limit the design space by creating rules to which they expect users to adhere. We encourage designers to reconsider the “rules of use” that they have used in their designs, so as to reconceptualise potential usage. This can help design for behaviour where rule use is not blindly followed, but oriented to; a case, as Robinson (1993) might say, of designing for unanticipated use.

By making these rules visible, we have the potential to expose the limitations of current technology, and develop design solutions that do not restrict use to the ‘normal’ case of action. Rules are useful to designers because they are simplifications of activity. Rules encode the normal case, and these are simplistic representations of work that are, in many cases, accurate enough for the purpose of design. However, encoding behaviour in rules (i.e. modelling user behaviour) has dangers in that they do not encompass the whole range of behaviours that *can* be performed (Schmidt 1991). Using examples we have shown that being able to break rules means that people are able to engage in a richer and more flexible set of actions (and therefore more appropriate to contingency) than when they are constrained to a limited range of rule-determined activities.

These examples were generalised to make a point about the use of rules when thinking about the use of technology. Laboratory based studies, it was argued, engender a view of technology use as being *determined* by rules. The examples above show that this neglects the way that rules can be broken in actual situations of use. As fieldwork demonstrates, telephones are often *not* answered. Rethinking the status of rules can be a resource for design, in that it can help us suggest designs that support deviant cases. The notion of rules as structures that are oriented towards ordinary conduct can also help designers to understand use better. Rather than limiting our concern to what might seem the most important patterns or rules of behaviour, it is just as important for systems to support the breaking of rules. As the aphorism goes, “rules are made to be broken”.

Acknowledgements

An earlier version of this paper was presented in a seminar at the University of Glasgow. The authors would like to thank Steve Draper and the participants at that seminar for their comments. We would also like to thank our anonymous referees for their insights and criticisms of the paper.

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