

The Innovative Use of ICTs

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Introduction

The extent to which users can be innovative or creative when using ICTs is a key undercurrent within this book. While attempting to conceptualise the innovation process in general, Mallard draws attention to various theoretical frameworks that emphasise ways in which users are creative, but suggests there are limits to that ability. In their empirical study, Battarbee and Kurvinen explore the creative process in achieving multimedia messaging, while Sotamaa examines the various levels of user innovation within the field of computing gaming – examples of which are cited in this chapter. Clearly the 'innovativeness' or 'creativity' is important, but equally clearly it refers to a number of different activities. Reviewing past and current research on ICTs, the chapter aims to chart some of different ways in which users are innovators¹.

In fact, this has a further relevance for two other main themes of the book. One theme concerns issues to be faced in ICT development when trying to imagine users and uses. By exploring what innovative use can mean, the levels on which it can operate, we can re-consider what types of things we should be researching if we want to understand how potential users will relate to ICTs. And this might have implications for design. The second theme is how to involve users in the design process (see also Hoogma and Schot, 2001; Haddon, 2002) Once again, if we can appreciate the different ways in which users

can be creative, this can have a bearing upon the types of feedback, or input, we would want from users when asking them to evaluate their experience of ICTs

However, first it is important to add some reservations about these key terms ‘innovate’ and ‘creative’. Generally, these words have positive connotations, but the outcomes of creativity need not always be so beneficial. We might consider, for example, the damage that can be caused by the creative development of computer viruses. And those hacking into computer system or into protected copyright software can have an ambivalent image, depending on exactly what they do and whose perspective one takes. Associated with images of the ‘innovative scientist’ or ‘creative artist’ these terms also run the danger of setting high expectations among researchers. This can lead to disappointment when they evaluate the degree of creativity involved in certain uses of ICTs. In particular, one can question the degree of novelty of certain innovations or innovatory uses if they have predecessors. However, given that new practices are usually developed out of older ones (Jouet, 2000), one also has to ask how novel does ‘innovatory use’ have to be?

Finally, there is one other key term often associated with discussions of creative use, as shown in some of Mallard’s examples, and that is ‘unanticipated’ use. Of course, we can ask who did not anticipate that use – usually this means industry. But we can also ask the question: in relation to what was it not anticipated? An example here might be when a pattern of use is at odds with certain wider societal discourses concerning how technologies should be used. This happened in the UK when some home computer producers and enthusiastic amateurs expressed disappointment in the 1980s when early computers were mainly being used for playing games (Haddon, 1988).

With these reservations, we can now return to the organisation of the chapter. There are times when we see that the initiative to develop or use ICTs in a certain way is coming from users rather than involving an innovation process initiated by companies or other institutions (such as the state) or from professional designers. Hence the first part of the chapter examines some of the different forms, large but also small, that this type of innovatory use can take and how this can contribute to the technological landscape. These are nevertheless the types of ‘exceptional’ examples, often ‘unanticipated uses’ and pioneered by some subset of the population, that are regularly cited in discussions of the innovation process – one of the traditions to which Mallard referred. In the second part of this chapter we turn to the other tradition that Mallard highlights: approaches focusing on the creativity of people when dealing with ICTs in everyday life. Here we switch the level of analysis to look at daily acts of ‘innovativeness’, routine ways in which users actively manage their technologies.

Table 4.1: Types of Innovation

Types of innovation	Examples (discussed below)
Enthusiasts designing and re-designing ICTs, improving existing or developing new applications.	Technical hobbyists and early microcomputer projects, including the role of amateur enthusiasts in writing early games.
Enthusiasts developing new practices using ICTs, creating new content or establishing new patterns of interaction.	Early radio broadcasting by radio hams; on-line communities or other grassroots initiative.
The more widespread emergence of creative design and content.	Club and personal web-pages.
The emergence of new patterns of use or new practices within the wider public or subgroups of it	Using the early telephone for social purposes; the practices emerging around SMS.

Although the following explanation of Table 4.1 indicates some of the distinctions between these different levels of innovation, there is inevitably something of a continuum between them. In principle there may be examples where it is difficult to decide whether a particular form of innovation belongs to one level or another.

At the top of Table 4.1 we have the level of design and re-design that is usually associated with technologically skilled and often enthusiastic users who somehow transform the potential of ICTs. In his later chapter, Sotamaa provides exemplifies this through the case of ‘moders’, games fans who modify existing games.

This level of innovation can be illustrated further with the example of the first microcomputers, a development largely unanticipated by industry² (Haddon, 1988). There were those who built their own small computers even before the first microcomputer kits appeared, before hobby computing became established. However, once computer hobbyist communities started to appear these enthusiasts were encouraged by peers, clubs and the hobbyist press to explore the possibilities of this technology. The hobbyists developed a range of innovatory projects and ways to use the microcomputer. The legacy of this period of hobbyist inventiveness was the development of what became the PC industry. Hobbyists gave the product area early visibility that eventually helped it to become a consumer electronic, developing, in particular, the numerous computer games that helped shape the interactive games industry.

In the field of industrial innovation, the ‘lead users’ noted in Mallard’s chapter have been characterised as being competent, resourceful and interested in innovation (Hoogma and

Schot, 2001). On the whole, users of consumer products do not fit this description so well, but the type of enthusiastic amateur described above comes closest. Often they are professionals in some field (e.g. engineering, programming) related to their hobby. Sometimes it becomes hard to draw the line between characterising them as users or designers, as in the case of the university students who were invited to experiment with the first minicomputers and who developed innovative 'hacks' - the origin of the term 'hacker'. One example of such a hack was the first action computer game discussed in Sotamaa's chapter (Levy, 1984). The thin line between user and designer was also exemplified in the later history of games, where some amateur enthusiasts developed their hobby into businesses in their own right or else became professional games designers working in this new cultural industry.

The case of the microcomputer also illustrates how the nature of the technology enables or constrains the possibility of innovation. The core of the earliest microcomputers basically consisted of an assembly of microchips. Thus, expensive tools for precision engineering were not required for the microcomputer's construction. Most of the computing principles that were involved had already been worked out in the previous decades and that information was widely available, as opposed to being the closely guarded secret of corporations. Once the microprocessor chips that constituted the building blocks of a small computer became accessible and affordable, the relative 'makability' of the microcomputer enabled a hobbyist involvement. The same point had been true of early radio technology. Indeed, a number of commentators have drawn the analogy between the early history of hobby microcomputers and that of ham radio. Finally, to give a more contemporary example, the availability of freeware enables a whole community of enthusiasts to continue refining operating systems such as Linux

whereas this could not happen with the guarded secrets of Microsoft software design (McKelvey, 2001).

Exploring the example of PC games enables us to think in a little more detail about the type of innovation taking place. We saw that games per se were first developed on the earliest minicomputers, long before microcomputers appeared. Indeed, by the time games were being developed for these smaller machines a game industry had appeared based on arcade machines and on dedicated home video game players (Haddon, 1999). So in this instance the innovativeness lay in converting some existing games to the new microcomputers, getting the code to fit in the small memories, sometimes developing new genres of games, or else developing new games within existing genres. This relates to an earlier observation that innovativeness is often built upon something that has gone before.

Turning to the next level in Table 4.1, innovation, even by enthusiasts, may involve not so much technical manipulation but rather new practices, doing new things with the technology. In his chapter, Sotamaa provides the example of games producing Machnima films to illustrate this.

A more historical example would be the case of early ham radio. While the most common activity was point-to-point communication between hams, some of this community also pioneered the first radio broadcasting, playing music over the airwaves. They showed what was possible and what could be popular before radio broadcasting was taken up by commercial corporations in the US (Douglas, 1986).

Contemporary examples would include those people setting up various forms of community on the Internet, ranging from fora which involve mainly on-line interaction, such as listservs, to arrangements that relate to some offline community, such as the web-site where local residents groups can interact as a supplement to face-to-face contact³. While these fora can be set up by organisations, (such as local councils) there are also grassroots initiatives spearheaded by enthusiastic amateurs. Such innovations have helped to create some new forms of participation in and flow of information among ‘communities of interest’ or locally-based communities.

However, hobbyists or enthusiastic technologically-oriented amateurs are not the only innovative users. If we move on to the next level in Table 4.1, we now see innovation beyond those ‘elites’ that have relatively high levels of technical expertise. Here we might think of the voluntary club or association web-pages prepared by their members. Or we might consider personal home-pages. These can still involve creativity in various senses: in terms of choices about design, about information/content, about links to other web-sites, etc. In this context, Sotamaa also refers to gaming web-sites and gamers distributing their own content.

In terms of their consequences, such innovations can offer new forms of visibility and facilitate new contacts (e.g. for such associations as folk dance groups, but also for individuals). Like the early hobbyist community, web-site creation is also a form of creativity that is being actively encouraged, as Internet Service Providers invite their subscribers to consider this option. These ISPs or other companies even provide the software for creating such sites as yet one more thing that users can do on-line. If we try to think of a hardware equivalent of such creative activity that extends beyond special

interest hobbyists, we might consider the people who wire up their home for distributing audio-visual signals around the house, much in the spirit of do-it-yourself home improvements.

We now turn to the last level of innovativeness in Table 4.1. Just as early radio broadcasting involved new practices when using a technology rather than doing something to it in terms of design, the same development of new patterns of use can occur outside of technical hobbyist communities. An historical example would be the way in which people started to use the early telephone for social, or to be more exact socialising, purposes. The telephone operators had not anticipated this, given that they had intended the phone to be used for more utilitarian goals (Fischer, 1992). A more recent example of the role of a particular social group in helping to create new practices would be the *Kogyaru*, the Japanese street-savvy high school students who pioneered and popularised early recreational uses of mobile communication, first with pagers in the early nineties and then with mobile phones in the later half of the nineties (Ito and Daisuke, 2003). Sotamaa's chapter discusses this level of innovation in relation to various forms of communication between gamers that have emerged as well as the teams and leagues that have grown up around game-playing.

Finally, we can show in more detail the nature of such social innovativeness with the much-quoted example of SMS or text messaging. This function was originally added to compete with paging systems. The earliest pagers simply displayed the phone number to call back. Later, alphanumeric pagers could give short messages of 80 characters. SMS was a two-way version of this with 160 characters, offered as a function to compete with pagers⁴. But the social innovation among users, especially youth, lay in the way it was

taken up and the practices that developed around it. The range of social messages, some of which would not in the past have been sent, was far greater than ‘call back on this number’, and sometimes involved some sophistication and ingenuity (Ling, 2003; Segerstad, 2003). The area has seen the emergence of etiquettes and social expectations about replying as well as communication-related practices such as copying messages, sharing them with others, etc. (Kasesniemi and Rautianen, 2002). It was this whole set of practices that was unanticipated.

To different degrees some of the above examples might seem exceptional. We might come to regard the people taking such initiatives as being pioneers, doing things, to varying degrees visible to a wider public, which in retrospect we might see as creating something novel. In contrast, the second part of the chapter now deals with research on more common experiences of ICTs in everyday life.

Creativity and ICTs in everyday life

There are a number of different research approaches and empirical studies that cast light on this type of innovative behaviour. Communication studies and media studies both show how we are, in fact, always creative in dealing with ICTs. Although not a literature in its own right, many empirical studies throw up examples of individual innovative uses of their technologies. The final examples all involve the different ways in which people manage ICTs in daily life. Writings and studies within the domestication framework deal with how we actively manage ICTs in daily life, rather than just letting these technologies ‘impact’ upon us. This literature, as well as that dealing with parent-children relations, also draws attention to some of the dynamics of household life that are relevant. Finally,

the mobile phone literature has contributed to our understanding of what creative actions are taking place around technology over and above a narrow focus on its use.

Table 4.2: ICTs in Everyday Life

ICTs	Examples (discussed below)
Interpreting texts and symbols; creativity in communication	Making sense of media, managing telephone conversations, multimedia messages
Discovering novel uses for ICTs	Various examples of the way individuals have found uses for camera phones
Managing ICTs Making ICTs aesthetically 'fit' into social spaces, displaying ICTs, personalising ICTs. Attempting to control other people's use of ICTs; Resisting that control. Managing communications.	Locating of TVs and other ICTs in the home, adorning PCs, decorating mobile phone covers. Parents controlling children's use of TV, the phone, the Internet; Children's 'parent management strategies'. Giving out mobile phone numbers; dealing with unwanted or disruptive incoming calls. Interacting with co-present others and with the caller.

Within communications studies there are traditions of studying how we are always creative in the ways that we communicate, including in terms of our use of language when communicating through ICTs such as the fixed telephony and later mobiles (Schegloff, 2002). Meanwhile, in media studies there has been approaches that indicate ways in which audiences always actively interpret texts: they have to perform some cognitive work to make any sense of them at all. Admittedly, such discussions are usually arguing in terms of 'active audiences' in contrast to any claims that we passively consume media. But such readings of text could still be considered to be creative, perhaps even more visibly so when people 'decode' them to arrive at meanings not intended by their producers. To the extent that technologies themselves can be viewed as texts, this

would also be true of how people interpret the meaning of particular ICTs, as reflected in Colombo and Scifo's chapter.

Even if these traditions ultimately indicate the manner in which people are 'innovative' and 'creative' all the time, these observations can nevertheless be of relevance for ICT product development. For example, Battarbee and Kurvinen's chapter can be viewed in this context, as the authors examine how people have to work, and indeed cooperate, in order both to create and make sense of multimedia messages. Hence, this level of 'innovation' on the part of the user becomes important for appreciating how we first learn to use ICTs. In this respect we might consider the literature examining people's 'apprentiships' in relation to learning to use ICTs, as in (the difficulties of) learning to become an Internet user (Lelong and Thomas, 2001). This is relevant for the producers of these technologies because if the apprenticeship proves too demanding, too difficult or too time-consuming, if the actual creativity demanded of users to make some ICT become of interest is too great, then this can in itself become a barrier to using the technology.

The first part of this chapter outlined some practices that were initially developed by some subset of the population, such as youth or certain groups of youth, but then became more widespread. Texting was an example. Yet, we need to be aware that there are many uses of ICTs that individuals or even small groups of people routinely discover but which remain fairly unique to them. They may never achieve a significant public visibility. While they often come to light in the course of empirical studies, although (it is the experience of this author) they might not necessarily be reported in publications.

This level of creativity can be illustrated by examples from a small-scale British study of camera phone use conducted in 2003 (Vincent and Haddon, 2004). One household found that the small picture that could be taken by the camera phone was just the right size for *Loot*, the magazine carrying classified advertisements where individuals sell or request items. In this case, the family concerned took a picture of the car they were trying to sell and submitted it with their advert. In another case, someone with no mirror to hand, took a picture of herself to check how she looked, to check her make-up. That same person was looking at houses that she and her partner were planning to buy. She used the camera phone to take pictures of the features they liked in order to show to estate agents what they wanted when searching for their ideal home. Meanwhile, one teenager asked a friend with a camera phone to take a picture of himself and transfer it to her mobile using bluetooth. When he called her mobile, the picture would then appear.

The point is that at this time the mobile operators were advertising ways in which the camera phone could be used, but these did not include any of the types of example listed above. They remained fairly idiosyncratic to the people concerned, and, in fact, sometimes surprising when first described. While Columbo and Scifo in this book describe types of camera phone use at a more general level, for example, relating it to the use of photography, these examples are far more specific to very particular circumstances and goals. And yet, monitoring this more detailed form of innovation can inform product development. For example, some Finnish girls originally painted the covers of their mobile phones with nail varnish and attached stickers to them (Oksman, 2002). This later inspired the development of transferable coloured covers accessories. In this case we see that what starts out as a creative process on the part of a few users can sometimes affect the development of commercial products.

Right from its earliest formulations, the domestication framework had discussed the efforts that people go to in order to make technologies fit into their personal social spaces (Silverstone et al, 1992; see also Haddon, 2004). This can include where they locate technologies in rooms either for aesthetic reasons or because they are aware of the messages that such displays of ICT will give to others. For example, some people have TVs that can be shut away in a cupboard, a gesture that acts as a statement about the way they are controlling the role of television in their life. Or, in other studies, some teleworkers left their high tech paraphernalia on display to indicate the nature of their work (Haddon and Silverstone, 1993; Haddon, 2004). A related form of creativity involves efforts to personalise ICTs, for example, through the adornments people add to them, such as sticking things onto their PCs or decorating them with other objects (Lally, 2002). The earlier example of Finnish girls personalising the outsides of their mobiles might also fit here, with the implication that product developers need to look at what people do to and with their technologies as well as how they use them.

Given its chief focus on interpersonal relations within households, domestication research has also examined the attempts by some people to control the use of ICTs by others – the most familiar of which is probably parents attempting to regulate children's use of technologies such as the TV, the phone⁵ and the Internet. Strategies may involve parents trying to negotiate rules about use, but also includes parental decisions about the location of ICTs (e.g. putting the PC with Internet access in a communal space, Livingstone and Bovill, 2001). While these may be the more common examples, qualitative research shows more extreme measures are also possible such as hiding the cordless phone, putting the fixed line in places where it is uncomfortable to use and sabotaging ICTs⁶

(Haddon, 2004). There are also examples of people attempting to control their partner's use of ICTs through withholding information that the technology could be used in certain ways⁷ (Haddon and Silverstone, 1996).

Of course, such efforts to control the use of ICT can provoke resistance, for example, when children secretly gain access to ICTs at times when parents are not present.

Research has also documented how children develop tactics to combat parents' efforts to use ICTs to monitor them. For example, when parents phone up the children's mobile find out where their children are and what they are doing we have cases of children claiming that the mobile signal was lost, the mobile battery was dead, or else they sent parents' calls directly to voice mail (Ling and Yttri, 2002) – all part of 'parent management strategies' to avoid surveillance and gain some privacy (Green, 2001). Once again, both the efforts to control use and resistance to that control draws attention to ICT-related behaviour which could be considered to be creative, which is sometimes unanticipated by product developers and which is not simply captured by the notion of 'use'. Yet such background information can be relevant to design. For example, any technology sold on the basis of or otherwise offering the prospect of more parental control is effectively becoming involved in this politics of the household and should take this into account.

Turning to our relations with both our social networks and strangers, we have strategies for controlling contactability⁸. The mobile phone research has noted how users can be selective about whom they give their mobile phone number out to (Licoppe and Heurtin, 2001). But we also see such strategies in relation to the basic phone. Examples include using the answering machine for filtering calls (a use which was never stressed in the

marketing of the device), arranging for other people to answer the phone, unplugging the phone or in some other way turning it off⁹ (Haddon, 1998, 2004). Meanwhile, mobile phone researchers have charted various ways in which people have learnt to manage the experience of calls in public spaces. When receiving calls especially, mobile phone users have developed a variety of strategies for dealing with the fact that they are in the midst of co-present others. They give out signals to others through their body language (Cooper et al, 2001) or they sometimes seek out spaces so as to minimise the disruptiveness of the call. Other research has examined people managing the relationship with the communicator, for example by finding ways to speed up the call (Licoppe and Heurtin, 2001) and indicating to co-present others that they are doing this. All of these provide illustrations of strategies that go beyond use.

The above examples may all seem mundane, but they underline how much, arguable ‘creative’, work is taking place in relation to ICTs in the course of managing them in our daily lives and in our relationships with others. Such behaviours are not always captured in user scenarios where the emphasis is on people’s goals, desires, on the applications they will favour and on ‘user needs’. And yet the innovative ways in which people cope with the issues raised by ICTs can themselves have a bearing upon the ways in which ICTs are used and experienced. One question is whether such strategies can be considered during product development.

Conclusions

This chapter has explored the notion of user innovativeness, indicating the various manifestations that this phenomenon can encompass. It has not tried to define what counts as innovation and innovative use and what does not. Rather this account has tried

to show the variety of senses in which behaviour related to ICTs can be innovative and creative. The first part examined some of the conditions under which certain types of more exceptional or higher visibility user innovation can occur, or indeed, be encouraged. The second part dealt with more commonplace experiences, including the various strategies that people develop when confronted by issues emerging as they manage ICTs in the course of their everyday lives.

At the start of this chapter it was argued that an appreciation of the different forms of innovativeness was important for imagining users and uses. Like many of the other contributors to this book, this above account implies that we need to consider what the object of research should be, what types of things we should be researching, when we want to understand how potential users will relate to ICTs. Just as Tuomi's chapter asks us to re-think what is happening, what is taking place, when we have a cup of coffee, so here in this chapter we try to look beyond narrow definitions and measures of 'use', as when we consider the strategies people use to manage ICTs in their everyday lives. Moreover, in both cases, we might ask about the implications for design.

Second, it was argued that understanding the manifold nature of innovativeness was important for thinking about how to involve users in the design process. Sotamaa's chapter provides an example of the games industry trying to monitor and involve its more creative games 'fans'. But other ICT industries, to greater and lesser extents, also try to see 'what people do' with their products once the technologies are in circulation for the public to acquire. Sometimes, again to varying degrees, this feeds back into design. One contribution of this chapter is to widen the view of 'what people do' with technologies, when inviting them to give feedback for design.

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Endnotes

1 'Users as innovators' was one strand of the COST269 Helsinki conference on which this book is based. The chapters from Tuomi, Mallard, my own, Battarbee and Kurvinen, Mahé, Rantavuo, Vehviläinen and Joshi came from this strand. Hence, in different ways, many of the contributors comment upon these questions of innovativeness and creativity.

2 The computer industry at that time could not see why developing a less powerful, initially severely limited, machine would be desirable. Meanwhile the consumer electronics industry could not see why people would want computers in their home.

3 Perhaps the best example in the UK of this is Redbricks, based in Manchester.

4 Personal communication from Steve Hearnden, UMTS forum.

5 This was partly because of factors such as the cost of calls made by youth, and blocking the phone line (Haddon 1998), but also because of time 'lost' in making calls – time which could have been used for studying (from the parents' perspective) (Martin and de Singly, 2000). Some youth participating in that French study referred to this tension as 'the war of the telephone'.

6 In one case a frustrated father altered his daughter's handset extension in her room so that it would not make outside calls. She got around this problem by phoning out on the main phone and transferring the call to her room.

7 One retired husband had always told his wife that a VCR could not be linked up to their particular TV, when in reality he knew it could be - but he did not want her to use a VCR.

8 Various reasons for wanting to control contact have been documented in relation to the fixed phone line. For example, unwanted phone calls from acquaintances could be intrusive upon their privacy and peace. At times incoming calls could also interfere with the routines of the home, coming at unsociable or simply inconvenient moments - such as late at night or early in the morning, or when parents were getting children off to school or nursery or getting them to bed (Haddon, 1994).

9 One interviewee described how she used to bury the telephone handset under pillows.