

Interactive television at home: Television meets the Internet

A new innovation environment for interactive television

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Abstract

The Web and the Internet are the latest technologies to be harnessed by companies trying to develop interactive television. This paper reviews the efforts of technology companies and broadcasters to combine television and the Web in their products and activities, and how users are already using them both at home. It reviews some research on the way that TV and the PC/Internet are used at home, and suggests some ways that the Web could be integrated with television use. Unlike earlier interactive television projects, where the innovation was largely conducted behind closed doors and among consortia of companies, the innovation environment in which Web-based interactive television is being developed includes a huge number of existing users, technology and content suppliers who play an active role the innovation process. The concept of *social learning* is suggested as a area of development of tools for understand the process of technical, social and cultural change around innovation of this sort. In particular the idea of *poles of attraction* is introduced to understand why a huge numbers of supply side players and users are orienting towards the Internet as a possible solution to interactive television.

1 Introduction

Of all the visions of the future of television¹, interactive television (i-TV) is perhaps the most radical and powerful. In this vision the ubiquitous television set will change from being a device to watch television shows or films into a home terminal for access to and interaction with networked interactive technology, programmes and services. The possibilities and benefits of the technology seem self-evident, if only they can be made to work effectively and at a modest price. Many times we have been told to expect interactive television any day now². However, after millions of dollars spent, and many pilots and service closures, most of us are still no closer to having interactive television than a few hundred searchable teletext pages, and some phone-in TV shows.

In the efforts to create i-TV, numerous applications and technologies have been tried, with companies attracted by the possibilities of each new generation of technology, and responding to the continuous pressure to develop new products, be they technologies, services or programmes in order to maintain their share of consumer spending. The explosion of the Internet and Web is a new *pole of attraction* for interactive television developers that seems to solve many of the problems and uncertainties of earlier systems: all of a sudden the technologies, content, users and uses of interactive services are there and proving very successful, all that needs to be done is integrate them into television.

For the analyst of new innovations in television, three issues arise as companies are attracted to the Internet and the Web as a solution to interactive television.

1. Instead of being controlled by a small number of corporate players, the technology and service of the Web and Internet are in the public domain, and changing fast. The innovation environment is diverse, heterogeneous, and involves a multitude of companies and most importantly users in shaping the technology and services, which makes management of innovation more complex and give the market a much stronger voice.

2. There is major uncertainty over the relevance of Web-style interactivity to the use of television. Many commentators believe that content and services on the Internet or designed for the PC terminal may not be relevant for many users of the television, while others bet on the explosion of e-commerce through TV Web terminals.

¹ Interactive television is only one of a huge range innovation ideas in the extremely turbulent history of television: Pay TV, satellite TV, microwave TV, cable TV, video tape, the home video, the camcorder, videodisks of various types, teletext, high definition TV, colour TV, and many others (Winston 1998).

² The same could also be said for promises of wide screen TV, digital TV, High Definition TV, video phones etc, some of which have finally made it, while others are still languishing.

3. The television is no longer the only window for interactive services to the home. The PC is an increasingly common alternative, and is a more flexible and open platform for interactive services. The cheap web set-top box may restrict innovation and fix service and uses in a way that is frustrating to end users and service providers alike. What is more, there is an emerging paradigm in the technology industry of multiple 'low profile' terminals for interactive services. This could turn investment and attention away from both the PC and the television.

What links these issues is the importance of the *end users* as active players in the innovation-diffusion process. It was end- and intermediate-users adopting the Internet and Web that attracted interactive television developers, and it is these users who are now directly involved in the innovation process.

This paper uses *social learning* (Sørensen 1996) as an analytic framework of socio-technical change that includes an integration of end users in the innovation and diffusion process. Social learning goes beyond the development and diffusion of technology and content to include the creation of new knowledge, regulations, expectations, institutions and cultural norms. In particular it focuses on the role of users in innovation, including the development of user knowledge and practices, and the interaction between users and producers. In this process different actors (users and producers) orient to poles of attraction, including utopian visions, projects and trials, technologies, regulations, user groups, markets, uses, or emerging cultural norms, all of which may crystallise into real products and institutions or disappear to be replaced by a new ones. The process of creation, diffusion and use of new technology and content is not controlled by those innovating the products. Users and producers of technology and content related to television and new media slowly appropriate and shape each other's products and patterns of use, learning from each other over a protracted period of time. Previous examples that provide useful parallels to interactive television are the telephone and videotext. Both are network systems which changed as people began to use them, and found how they could be useful in ways that the developers had originally not considered as important.

In interactive TV, the Television has always been the dominant pole of attraction for both the producers and users, but only industry was interested in interactive technologies. Industry therefore drove innovation independently of any need or desire of potential users. Now the Internet has emerged, and it is pole of attraction shared by users and producers: the innovation process now is shaped strongly by the market. One outcome is a slow change from early models of technology and content based around individual use of media to one that integrates the existing collective use of media and the social practices that surround media products and technologies in everyday use. At the same

time, users are altering their everyday practices of media and technology use with the new systems that are currently available, changing the possible market for new products almost before they have a chance to come to that market.

This can be illustrated this by looking at evidence of the first few years of the co-existence and evolution of TV and the Web, covering attempts to integrate them technically, and find synergies between them, from the perspective of technology companies, broadcasters and end users.

Looking to the future, this article reviews qualitative research on how people actually watch and use television, and some experiences from current use of the interactive material on computers. Combined with reports of interactive television trials, it is possible to illustrate the rich use of both traditional and newer interactive media in the home. We can then more critically approach the uncertainty over the relationship between the Web and television. Fortunately for the optimists, the Web is not static - developments of services and content that reflect the way television is used at home for could make the Web and TV marriage a success. However in the long run through a slow process of social learning we can see interactive television developing into a richer medium that either the Web or TV offers today, but one that is far from the homogeneous television system of today.

1.1 The Wild World Web - innovation in a open environment

Most of the previous attempts to make interactive services for the home have had to start nearly from scratch, and concentrate on creating large-scale technical systems. The television has seemed the most obvious terminal to use as the display. In general, developers worked with technologies and services that, prior to roll-out, were not available to users. They tried to create ready-made systems that could be delivered fully functioning to the public. In general they were able to develop the systems without involving the end users, or at least without them being any more active in the innovation process than as subjects of research or controlled trials. Intermediate users, such as service providers (retailers, information providers, banks, and publishers) who could be persuaded to share in the technology based vision were generally involved in a partnership and exclusive manner.

However there is a problem facing developers of these network systems such as interactive television. While the technology can be made to work in the lab, these systems depend on building a critical mass of users (e.g. (Rogers 1995) p. 313, (Schneider 1991)) among many others), and on the content and uses of the system.

These non-technical elements are much more difficult and expensive to develop from scratch, and to a large extent out of the control of developers, especially when user participation is voluntary³.

One way to get round this, is to appropriate or modify an existing and established set of content, technologies and uses and users, and try and dominate the market, or improve that service or technology or extend its use to new users. The idea behind interactive television can be seen as an attempt to appropriate the mass market of television users and the existing infrastructure of television sets in homes. With the rise of the Internet and the Web as mass market interactive technologies and systems, it would seem an obvious choice for i-TV developers to try and use this as a resource for creating i-TV. In many ways it reduces uncertainty and costs associated with designing a system from scratch.

However, following this path this completely changes the innovation environment and process. Previous projects were dominated, if not completely controlled, by a small smaller of industrial and government players. The innovation process could be analysed as the interaction between corporate actors, and the individuals working in them. However, the Internet and the Web have evolved and continue to develop in a very different manner. End users and a multitude of intermediate user firms and technology firms have been responsible their development. Many different uses have been established and a huge variety of content exists. There is incredible dynamism in the innovation process, with competition between many technology companies and network service providers. This alternative innovation environment needs a different approach to managing innovation, and the marketing of interactive television. It also requires an analytic approach that can account for the large numbers of actors, especially the end users in shaping the technology, content and its uses.

1.2 The Web and Television – an uncertain marriage

There is no guarantee that a marriage of television and the Internet would be a happy and prosperous one. There is major uncertainty over the relevance of Web-style interactivity to the use of television. Most simply it is the following: the television is a collectively consumed medium, viewed ‘passively’ and from a distance, sitting in a comfortable chair. In contrast, the Web and computer-based interactive products demand a high level of engagement and interaction with the content, and are used by

³ The French Teletel system is one example where this was ‘successfully’ done, by giving away the end terminal (Minitel), and providing an essential service, the telephone directory, on-line as the default means of access (Feenberg 1992).

individuals sitting close to a computer screen. These are thus incompatible uses, technologies and content. While there are strong arguments for this position, it would be naive to accept it without further investigation, especially in the light of existing early-adopter uptake of Web on TV products, and other trials of interactive television.

Another factor has also complicated the vision of interactive television. There is now an alternative to the TV as the terminal to the home, the PC. I-TV developers may get a free user network and content, but with it comes competition from the PC, the expectations of existing users, and uses and content developed around the PC not the TV. Many people have both television and computers at home. Does it make sense to develop the television as an interactive terminal, even if there is still a huge number of PC non-owners or users who might use it.

These uncertainties, and the on-going process of innovation that accompanies the working out of the answer between the market or users, and the various players of the supply industries, is an important example of complex socio-technical change that needs addressed.

2 The Struggle To Make Television Interactive

Interactive television should not be defined as a particular technical or information system : it is a term that has been appropriated and rejected by many of the players trying to change television, and could be applied to many widely different systems. I define interactive television as bringing possibilities of interactive multimedia technology to Television. It is therefore crucial to understand Television to understand what interactive television might be. Television is not just a technical system or a series of programmes. It must be considered as a major business, and placed it in a wider technical and social context. Television is also a mass market and cross-society phenomenon, almost everyone watches TV, and it is the sheer reach of the medium that makes the integration of new technology into Television a major issue.

Television is central to most people's domestic life, and to our cultural, social, political and consumer awareness. In other words, 'television is everyday life' (Silverstone 1994). Most people in the developed world, and increasingly in developing countries, rely on television as a primary source of global news, of entertainment, of political awareness, product and cultural knowledge, and a resource to construct and reflect self-identity. It is also embedded in the cultural and political (Williams 1990 (first pub.

1975)): national and now global culture would be very different and may not exist without television in its current form. Television is also an important industry, a huge money earner, and a controversial business that challenges political and cultural norms as it becomes more commercial and international.

Interactive television may involve changing television in one or all its aspects. Changes in technology that are worth their investment will certainly run in parallel with changes in the industry, use, content and regulation. The social shaping approach indicates that attempts to create interactive television systems are the result of the interaction of these factors, including commercial interests, competing products, regulation, developing user needs etc (MacKenzie and Wajcman 1985; Williams and Edge 1996), as well as the invention of new technology. Successful i-TV projects will be the ones that take advantage of the embedded nature of technology, however much the most technically sophisticated or creatively daring ones may inspire us.

2.1 A brief history of i-TV

Many attempts have been made to develop 'interactive' television (Carey 1996). These have been undertaken around particular poles of attraction that provided the motivation for experimentation and change – sometimes the technology has been the attraction, sometimes the content, and sometimes the users and consumers. These poles of attraction have generally only been of concern for small groups of technology and infrastructure companies and, on occasion governments wanting to develop industry or infrastructure.

The earliest TV systems were two-way communications devices; after the broadcasting model was established, systems such as QUBE in the 1970s used cable systems to provide interactive services involving home audiences, but failed to offer sufficient return on investment [Carey, 1996 #184]. The 1980s saw the development of videotext, either broadcast or via a telephone modem, around a model of information searching and browsing. In the 1990s many expensive proprietary interactive television projects were set up, or at least publicised, by technology and network companies anxious to realise long standing science fiction dreams, bolster share prices and generate new revenue streams. Although many of these projects may have 'failed', they gave birth to huge numbers of spin-off sons and daughters: media and technology products and formats, business opportunities, engineering and business knowledge and experienced personnel. In addition, much was learned from these trials and services, not least that the services, content and the audience/users are the key factors and these need more than just vast amounts of cash to develop.

In the last years of the 1990s, the Internet, and more particularly, World Wide Web content, have emerged to offer a way of providing many i-TV services more easily and cheaply than some of the more technology heavy and commercially integrated systems. In the same way as earlier technologies were grasped upon to provide interactive television, the Web and Internet became one of the poles of attraction for system and business development. Unlike previous systems, the Internet and the Web are attractive because there is a huge amount of readily available content and millions of existing users, the development costs are being shared between many companies, and business use is covering much of the investment and risk.

However, the Internet is not the only pole of attraction for development. Digital television has also opened up possibilities of piggy-backing interactive services on conventional television, but even this is looking to the Web as a source of content technology and market credibility. Digital Television's main claim to be the platform for interactive television is that is primarily television, and most people (assuming it becomes more than a minority service) will buy it for traditional television content, and get well structured interactive services sneaked into their homes by the backdoor (Trojan Horse effect). New technology main use is to provide controls on the television such as conditional access and pay per view. The argument goes that instead of consumers relying on the somewhat confusing and half-developed Internet and Web, digital TV interactive services are designed for television users and will avoid the supposed horrors of the Web by giving control of content and services back to broadcasters and monopolistic service providers.

However, while digital television is still primarily about straightforward television broadcasting, the Web and Internet remains the main pole of attraction in terms of interactive service. But for I-TV there remains an important question? Can the Web and the services of the Internet really satisfy a mass market, television-based audience and industry?

3 Changing the Web - Social Learning in Interactive television

Commercial companies have their own interpretations of interactive services based on their skills and interests, and they have come up with a bewildering variety of possible configurations for the delivery system: Internet to the PC, Web on the TV, interactive Digital TV, Full-service integrated interactive TV, Video on Demand, Broadcast Internet, Digital TV to PC, Telephone Web terminal etc.. However, many of the companies involved in interactive services to the home are placing bets on several of these options at the same time: strong backing for one or the other tends to be a political move aimed at creating publicity, creating consortia, getting political support or boosting the share

price. The dominant pole attraction is moving away from the television set in the home to focus on the individual and groups of users at home, at work and on the move. There is an increasing acceptance that we will use a range of interfaces at home, and the important business is getting the services and content that will engage people, and be useful to individuals and companies in the long run. It is also becoming clear that few people will have access to only one system, and competition at all levels of service will be the order of the day.

In addition, the development of mass market systems is no longer defined by the supply industry, or by regulators. It emerges from a complex process of *social learning*, a combination of market forces, changing business relationships, a developing culture of production and use, evolving regulations and standards, and specific events, across all the actors involved in the shaping of technology and content. This co-evolution of the technical and social systems is what will give rise to interactive television.

3.1 Social Learning

Social Shaping of technology is an approach that focuses attention away from technology as the source of social action. Instead it highlights the way that new and old technology is appropriated and incorporated by people in pursuit of their own aims often accompanied by struggles over definition, uses and control (Williams and Edge 1996). A particular aspect of social shaping is the concept of user *appropriation* of technology, with the *translation* of technology into a different use-context and invention of new uses or re-innovation of the technology itself. Earlier examples from telecommunications show this process in action. The telephone was originally implemented as a business tool, and personal calls were highly discouraged. Women were not expected to use the phone, and it was certainly unacceptable for the respectable middle class to use the telephone for a social call. However some people, especially those isolated on farms, started to use the phone for 'personal' conversations. It took several years, and developments in the technology before the telecoms firms accepted that this was a legitimate business, and before it become socially acceptable to use the phone to chat (Fischer 1988; Moyal 1992; De Sola Pool 1997). A similar development occurred with the Minitel system in France (Feenberg 1992; Flichy 1995) and the emerging Internet in the US. Designed as information systems, they were quickly taken over as communication systems by a minority of users, developing their own technical add-ons to the main system. It took many years for this use to be accepted by the majority of users and the system owners and managers, and many years for the enabling technology to become more user-friendly and flexible to spread to a wider user group.

Social Learning may help us to understand the slow process of technical change and appropriation of technology by producers and users alike. It focuses analysis on understanding the interactions and relations in the web of users and producers, and the 'ability to learn from production and use of technologies and to communicate the outcome of such learning' (Sørensen 1996) . Social learning emphasises the non-technical innovations, such as new uses, new organisations, new knowledge and expectations that are created alongside new technologies and in this case, new media content. Apparently failed technology projects often have successful non-technical products, such as knowledge, expectations and users that are incorporated into and facilitate the next generation of technology. 'The mistakes are as important as the successes' (Curry, 1998)⁴. Social learning also specifically focuses on the importance of end and intermediate users in the innovation process. A first-generation innovative product seldom lasts very long before it is replaced by, with changes made in response to users uptake and experiences, as well as producers making technology-inspired changes. The diffusion and innovation process is thus continuous, and involves users as well as producers putting together and using technologies and services in a way that undermines the attempts of producers to configure and impose systems and standards. For mass-produced items this is process not a huge problem, but for large scale infrastructure systems it is difficult to keep withdrawing and up-dating. In this case it may be more efficient to use technologies based on global layered standards so that individual parts can be updated independently (like the Internet).

This phenomenon is apparent in the way that the Web and Television are bumping up against each other. Producers and users are experimenting with the co-existence of both systems, learning from their experiences of the other media, and slowly creating hybrids can be appropriated into the homes of users, and the businesses of media and technology suppliers. By choosing technology and content that is already in widespread use, and under constant innovation by other firms and users, interactive television developers are operating in a completely different innovation environment to that in which earlier systems were developed. The end and intermediate users are having a huge effect on the development of products, because they are adopting systems, creating content and technology, finding new uses and creating new markets at the same time as the producers are trying to develop new products. They are trying to hit a moving target, and must continually incorporate changing user led innovation into new systems.

⁴ Paper given at Social Shaping of Multimedia Conference, Edinburgh June 1997, to be published in "Social Informatics" Special Issue, ed. Robin Williams, Fall 1998.

By considering the delivery technology, the users, and the content producers separately, it is possible to see how different actors in the innovation process have attempted reconcile the Web and Television

4 First attempts at Web on TV

The Web offers content that can be use in a similar way to television - it is essentially a broadcast media form. However the existing Web delivery system, the Internet to PC, offers a number of other facilities such as e-mail, home banking and chatrooms that are commonplace on the computer, but it is unclear to what extent will they transfer to the TV? Early models of Interactive TV were based on the television being the sole interactive platform in the home. The TV terminal could offer similar services to those that a minority might have on a computer. Many Web-on-TV systems are based on a similar rationale. Today however, promoters of interactive television systems are finding the world is moving on around them, and they are having to learn to operate in a new business and technical environment: home computers and Internet connections are becoming increasingly affordable and widespread, and look like usurping this interactive TV model. This returns to the PC v. TV debate of 1995/6, which the PC won, but the TV has not yet lost. Does the television still offer a relevant alternative to the PC? Are there enough potential users to justify investment? On the other hand the use of home computers and the Internet is based largely on e-mail and personalised services. In order to attract customers, does the Internet on the TV system have to offer these, or can we find alternative 'killer applications' that justify Web-on-TV.

4.1 Technology driven

The principal poles of attraction for the technology companies are the latest multimedia and network technologies, which when harnessed will deliver users, and thus profits. Technology driven attempts at bring the Web to TV are based on producing a set-top box that acts as an Internet terminal, displaying Web pages, and facilitating e-mail and some basic transactional services. At the simplest level, some companies were content to put at PC in a black box with an infrared keyboard and use the TV as the monitor, as the earliest home computers did. Most of these sank without trace. For most of the developers a new solution was required, and this was a dedicated Web-on-TV terminal. This could offer simple network services at a cheap price to people who did not have PCs. The first challenge was of course to get the technology to work, with the limitations of the resolution of the screen, the imagined \$200 price barrier and other restrictions. These products and their business model, which tended to be based on making money as a unique ISP made no attempt to link the content viewed in the Web link to TV content. NetChannel, set up by NetConnect, was originally a set of Web pages acting as a one-stop shop for users of the set-top, covering conventional areas

such as news, sport, weather - media products already available on Teletext and in the newspaper, as well as on TV.

However, with poor sales, and increasing availability of cheap computers and Internet connections, there was a serious rethink about what people might actually want from an 'advanced' television information interface. The second generation exemplified by WebTV (Microsoft, Philips, Sony, and Pace among others) borrowed directly from Teletext content and from the Electronic Programme Guides (EPG) being developed for multichannel digital television. In this version, the benefit of the Web on TV was seen primarily to supply complementary information about conventional television services and programmes, either broadcast, or downloaded via the telephone line. At the same time, the technology of the set-top was being sold to be included in digital TV set-tops and television, and the EPG was being touted as the killer application for the Web on television. By mid-1998 neither was fully launched, or had attracted the attention of users. Meanwhile, while the technology industry was starting to integrate the Web and Television at a level slightly more sophisticated than just sharing the same cathode ray tube, more interesting developments in integrating content came from the broadcasters.

4.2 Broadcaster Driven

Broadcasters are reacting to the challenge of the new media, and to the concern that the Web and other Internet services are taking away viewers from their programmes, and more importantly, from their commercial customer's advertisements. The technology of the Internet has been a powerful pole of attraction for broadcasters with many companies launching and re-launching services with considerable uncertainty about whether they will work and whether they are able to adapt their businesses to working with on-line media. However the a growing numbers of end users and advertisers that are also becoming an important focus and driver for broadcaster development of interactive services. The approach of many broadcasters is to integrate Web content with other media, in a *complementary or supporting* role, e.g. advertisements, television programmes (e.g. BBC Interactive, CNN), news business (CNN, Time Warner, BBC), Music Programmes (CityTV, Toronto). The Web can be used as a complement to programming, but also as a complement to the business, exploiting talent and brand in different and original ways across media different media⁵. This approach has not been lost on some technology companies either. Technologies, such as Intel's InterCast⁶, or

⁵The BBC in the UK have television programmes, magazines, web sites and events, on the same subject, carrying the same brand, and developed by an overlapping team of producers presenters and writers.

⁶ Intel's InterCast system, which has been through several generations, is based on broadcasting complementary programme information to the PC over digital TV systems.

the WorldGate⁷ web-on-cable system, enable the complementary information to be combined with the TV program on the same screen, respectively, the PC and the TV. The combined media products may not make the television set interactive, but they do bring interactivity of different sorts to the users of television media. This is done in different ways, both for collective and individual use. The Bravo cable TV station in the UK, and MuchMusic in Canada both have Web sites and chatrooms that run in parallel to the TV channel, so viewers can participate in /view them at the same time. Chatrooms are example of a social community building up around a TV programme, with conversations linking in and out with the broadcast material. In contrast, the BBC and other broadcasters transfer and expand the paper based information sheets that accompany programmes, allowing viewers to follow up and engage more deeply with the information and ideas contained in the broadcasts.

4.3 Other service providers

Many large-scale interactive television projects include partners from banking, and retail industry, who see the possibilities on-line transactional services. However the Web has delivered where interactive TV has not and these companies do not restrict their interactive services and experimentation to interactive television. After a few years of hesitation, the Web and the Internet have been embraced by many retailers and banks offering home-shopping, and home banking. With development of Internet based services behind them, it is attractive to try exploit this, for example, by offering a Web set-top-box as a home terminal⁸ rather than develop a completely new system based on proprietary technology. The attraction for these companies is run services that are portable across a range of systems and interfaces, be they Internet based or running on a proprietary digital set-top-box or other service. The developers of interactive television have long assumed the importance of having service providers such as retailers, with strong brand names and established customer based using their systems. However they can no longer expect to be masters of an exclusive channel to the home, or expect these services providers to use their proprietary development and service technologies. Service providers are interested in being in as many profitable homes as possible, whatever the system, and demand some level of standardisation between Web and TV based information and transaction systems.

⁷Worldgate broadcasts web pages to individual subscribers on digital and more modern analogue cable systems. The Internet client is installed at the cable head end, and the small customer back-channel is used to select Web Pages. Advertisers build in hot links to their TV ads that allow views to switch straight to the advertiser's web pages.

⁸ NetCom, a French producer of Web set-top-boxes based its strategy on selling its terminals to companies such as banks wanting to offer their services to those without Internet connections.

4.4 User Innovation

While broadcasters and technology companies have been experimenting with the Web and television, so have end-users, at home in they're living rooms, bedrooms and communities. The Internet, video games and CD-ROM have attracted the attention of vast numbers of people out of curiosity, convenience, need, and a desire to keep up with the latest developments. Many people are exposed to the Internet at work and at school, and are taking these experiences home. Sales of personal computers and Internet connections have soared, and low cost PCs are priced at a level that makes multimedia much more accessible to the majority of the population. The Internet (which most people call the Web) has developed as an important pole of attraction for a significant percentage of the population, as a useful technology, but also as a cultural icon. An extremely important part of the Internet's strength is that is a pole of attraction that is shared between producers and user. However, for many people it also has neutral or negative connotations. Interactive television in its more integrated form is not well known, as almost no-one has had a chance to use it.

Our interest is in the role that end-users have as innovators in the apparent convergence of TV and the Internet. Users are finding ways of accommodating TV and the Internet and Web in their lives and homes. People are mixing two media today (Coffey and Stripp 1997), not only accommodating them, but linking uses: a TV programme used for relaxation might prompt an information search later on in the evening ; the complementary Web pages from TV programmes are accessed from the PC, at home, school or work; people are watching TV and using the Internet at the same time. TV is background noise to many sorts of activities, many of which now involve computers. People, particularly children, are turning off the TV to use the PC, although the evidence is varied, some supporting the theory that Internet users are watch less TV⁹, others that TV watching is not significantly changed¹⁰. as most current Internet users are not heavy TV viewers. Judging from the experience of NBC in the 1996 Olympics,

⁹. "The American Learning Household Survey conducted by New York-based consulting firm Find/SVP and educational consultant Grunwald Associates found that adults and children are "clearly sacrificing some TV time" to use PCs and go on-line... Find/SVP found that parents in 64% of family PC households report their children watch less TV as a direct result of using the computer. That percentage rose to 75% for households with a multimedia PC and 88% for homes where the kids go online often." (November 6, 1996) Cable World

¹⁰. "Media Central: The Internet is not a threat to TV: "A study by J. Walter Thompson on whether the Internet is gleaning members from the traditional TV audience finds that it is not. The study categorises television viewers as light, medium or heavy users and deems the first wave of Internet users as light TV watchers who did not affect TV audiences. The report purports that even if early Internet users were light TV watchers, the emergence of the Internet would have had minimal effect on TV audiences. JWT predict that in order for TV audience figures to be seriously affected by the Internet, medium and heavy TV watchers would have to radically change their Internet habits. " Nua Nov 14 1997 from Nua (www.nua.co.ie)

when as soon as there was a promotion of the Web-site on the TV show at 7pm over 300 000 people logged on, many people must already use the computer at the same time as the TV (Coffey and Stripp 1997).

5 Web and TV at home: User appropriation of media technology

If one of the key factors in the convergence of Web and television is the way that the general public, television viewers and Internet users are appropriating existing technology, is it possible to look at the differences and similarities between the Web and TV from the point of view of the user, to understand how a convergence might be possible? Analysts trying to come to grips with the WWW and Interactive services claim (e.g. Staffan Ericson, Chairman Vivo Software; Jakob Nielsen, Sun) that the Web will not be successful on the television, because television is viewed in a collective and passive mode. They are correct, but only partly. Television still takes pride of place in the living room, where friends and family watch together. Generally it appears to be a passive, relaxing way of being entertained, informed or educated: after a hard day working, maybe at a computer, the last thing we want to do is sit and click round the TV, arguing with the family about where to go next. However this analysis takes a very limited view on television use, and on the Web: there are many ways of using television and the Web, and the many reasons why they are used as they are.

5.1 Television use

First, consider whether television is basically a 'collective' medium. With changes in living conditions and cheap TV sets, we are no longer obliged to watch television in groups. When televisions first arrive in a community, they are often shared by large groups of viewers. With time, every household gets a television, and the family shares it. Today, many homes have 2 or 3 television sets. In the UK over 53% (BARB, Eurodata 1994) of homes have two TVs, and I have seen figures of 30% having 3 or more¹¹. Among families with children this much higher.¹² In addition, when there are only 1 or 2 channels, there is not much room for debate about what to watch, but as channels and choice proliferate, so is the likelihood that viewers will want to watch different programmes. As a pastime, television is less social than it has ever been. Gone are the days of sitting round the TV as a happy family, if those days ever (Wand 1968; Morley

¹¹This is the highest level in Europe, although below the USA.

¹² 50% of 10-15 year olds reported having TV in their room in B. Gunter et al. , 1994 Television, the Public's View 1993, ITC Research Monograph, John Libby.

1986; Lull 1990; Carey 1996). In shared homes, be they with families or friends, individual viewing is common. More and more people are living alone, and are able to afford television and new media technology. Television is becoming a solitary occupation, especially for the old, and the young single person.¹³

Quantitative research on television use is good at telling us how many television sets are in the house, how many hours they are on, and what programmes are on, but it does not give us insights into how and why people watch television. Qualitative, ethnographic research, e.g. (Morley 1986; Lull 1990; Moores 1995) is more difficult to conduct, but confirms what most of us know from personal experiences - it 'asks not what the media do to people, but what people do with the media (Katz 1977, quoted in Lull, 1990). Television plays a number of important social roles for viewing groups, both structural and relational. (Lull 1990). For example, even where several people are in the room at the same time, not everyone will be watching what they want, or watching at all. Everyone knows the phenomena of one family member (husband/father¹⁴ most frequently, but sometimes children (Lull 1990)with the remote control, surfing across the channels, be there 5 or 55, the others either watching passively, or engaging in a dialogue about what is coming on. Just as likely, by choice or not, the others ignore the TV, continuing some other activity. Gender studies of use of television, e.g. (Morley 1986; Gray 1987) show that many women do not have time to watch television as a sole activity, but are obliged to continue working on other tasks in the home.

Television has become a central part of social life within the household and within the community. We use television to bring us together, as a topic of conversation, but also to draw boundaries between each other (Goodman 1983)in (Morley 1986) p.23. These social roles, which go beyond individual programmes to the general presence of television in the home and community, suggest that uptake and use of other technologies and media will be affected by the ways that they are *domesticated* (Silverstone, Hirsch et al. 1992)into the home, and whether they are found to be acceptable or useful in the complex web of household rules and practices.

Television watching is not necessarily a 'passive' pass-time either. It can be highly engaging for an individual, and can also be an important relational mediator. Quiz shows, sports, soaps, the News, documentaries and dramas: these can all provoke lively debates around the television, allowing viewers to interact with the show and viewing

¹³ Television is not becoming an completely solitary occupation. Communal watching is on the increase as more and more public spaces have big screens, and pay television, and crowd pleasing events, such as football, oblige or attract people out of their homes.

¹⁴ (Carey 1996) in his study of AT&T iTV trial, found that the remote control was more often control my male members of the household than female members.

companions. These 'active' uses of television can be channelled into 'interactive' uses. Technical developments that allow one viewer/user or several to interact directly with screen material can harness viewer engagement and activity. Phone-in programmes, phone voting, and outside broadcast units that involve 'typical' viewers have always been a staple of television, and with the development of telephone technology, cheaper broadcast units and now e-mail, this form of television is having a renaissance. Viewer interactivity is a device used by producers to add to the appeal of a programme that is now being used of all sorts of audiences and programmes.

Changing television

Finally, the television set has been adapted for activities other than watching linear programming. These include on-screen teletext and video games. Teletext is an information searching or browsing system that is free in many countries, and has many users. In the UK Teletext Ltd claim up to 50% of TV viewers as users¹⁵. While the majority of content is produced by broadcasters or other service companies, particularly advertisers or retailers, there are systems for individuals to post adverts, and communicate directly with other viewers. Video games are the most advance of the interactive media so far developed. Video games can be a solitary entertainment, frequently sitting much closer to the screen than for viewing, or a group entertainment, watching others play or playing multi user games. Multi-player games, and the capability to network games machines, are becoming the increasingly important as a development path for the technology and content and business of video games. The market for video games is also changing as new types of games are introduced and the generations born with video games grow up, developing new patterns of usage and become parents with different attitudes to computer games to previous generations.

In sum, the television is already an, active, interactive, social (and anti-social) technology and media. There is no intrinsic reason linked to technology, or to our use of television, why interactive television should not be a success. However there are many good reasons why the existing content, software and hardware could be limiting it, or encouraging solitary or passive use.

5.2 The Web and the Internet

Turning to the World Wide Web, and other interactive services, we see an extraordinary number of possible modes of use. These can be passive or active, collective or solitary

¹⁵ In 2000, A report by Mercer Management claims over 70% of German TV watchers use Teletext.

just as for any other media. The Web also serves as a focus of social action and relationships around and away from the screen. Today, the dominant model, and probably reality, of Web use is an individual at a computer terminal with a small screen keyboard and mouse, using the system by themselves. Most of what is on the Web is text and information based, a medium that relies mainly on the user to control speed and flow of use, making collective access more troublesome for the user than producer-controlled material like television or music. However, there are many ways that people can and do use the Web, despite the interface and much content not really being purposely designed for other types of uses.

Surfing the Web is very similar to surfing the television. They are both normal ways of using the technology and looking at content. Surfing the Web can be more engaging, as the hops are between related content, and allow a more active exploration of a media space than does TV channel hopping. However, we often surf the TV or Web because there is nothing worth watching on a particular 'channel' or 'site'. Surfing for the fun of it is a use of the WWW that can lose its appeal¹⁶ unless goal-oriented, and is by no means the only mode of using the capabilities of the Internet.

Although evidence is still difficult to come by, and results of studies notoriously unreliable as uses and products change so fast, we are now able to draw some conclusions on how and why people use the Web today. For many users the Web is used just for particular sites that provide relevant information - most people do not have an endless thirst for information or the time and patience to spend scanning or collecting it. This is illustrated by the rise in importance of search engines and Web indexes, so called 'portals', that simplify the directed search for information, reducing the need for pot-luck browsing. However the Web does offer us new ways of using media, and breaks our reliance on a small number of information and entertainment sources and on the spatial and temporal restriction they impose. It also opens up completely new activities that the television cannot well serve.

Web content can be used passively or actively, in much the same way as other media content. Much so-called 'interactive' media content requires little activity or engagement. There is no more thought or active participation required of the viewer, than for many 'non-interactive' media products, from quiz shows to serious news items,

¹⁶Studies of evolution of Internet use carried out by researchers at Carnegie Mellon University e.g. (Kraut, Scherlis et al. 1996) show that WWW is highly variable, and unlike e-mail use, most adult users seldom build up stable and regular patterns of usage. They hypothesise that the personal engagement that comes with e-mail is far more attractive than the impersonal information and entertainment that is currently available on the WWW. This information may occasionally be useful, when there is a directed search, but in general there is less attraction to regular use of the WWW.

where the dynamic and flow of the programme is control by the programme makers and schedulers.

Today's technology and content is mainly designed explicitly or implicitly, for individual use. However the Web content can be viewed collectively as well. Web content is often used in groups around a computer, in the same way as video games and CD ROM products (J. Walter Thompson research 1996). Groups can use interactive products in the same way as they use TV - as passive viewers of one user interacting¹⁷, or as a co-operative group. The Web allows a very active social use, that of showing and guiding, that does not exist with the television. The complexity of the systems and the constant innovation of the Web, which could perhaps be more accurately be described as the 'Maze', makes the 'showing' mode of use an necessary and common feature of communal Web use. Going further, today most Internet devices only have one controller, the keyboard and mouse, but this is undoubtedly a temporary phenomenon: games consoles are routinely equipped with multiple controllers, because the content permits it and the users demand them¹⁸. Future Web services and terminals, especially those designed for interactive television, could be designed around 'exploring together'.

Interactive media and technologies appear to have many of the same characteristics of collective and social usage in homes as television, but they are not the same. Different technologies and different contexts may augment or diminish some of the characteristics of television. For example, it becomes a collective medium by offering services that require two or more viewers to be actively involved, such as games or guiding. By being difficult to use, it could create more definite boundaries, between those who are able to use the system, and those who are not. However clear understanding of what social impact it could have at the level of the household is not possible because there are few stable factors to be assessed.

6 Mixing the TV and the Web/Internet: future possibilities

The development of a hybrid media of the Web and the TV is not the simple knitting together of technology. It needs a rethinking of content, and of how we use television and interactive media. No one user has a particular way of using the television, we change from hour to hour day to day, year to year - sometimes we want to relax and let the producers and schedulers control the flow of the narrative and the programming. Other times we are looking for information, we are trying to learn, or sharing time with

¹⁷ Women in the AT&T trial, who were used to listening to TV programmes in the living room, while working in the kitchen, also "reported that they monitored iTV in this way while another family member used it (Carey 1996).

¹⁸The AT&T trialists played games on the system, and had to keep passing the remote between them, and were very keen to have multiple controllers (Carey 1996)

friends. The Web and interactive services on the television should reflect these multiple uses.

Current use of the Internet appears to be mainly for information searching, and communication, which are not important uses of television. For those interested in information, the PC is an ideal interface. Even the functions of the video recorder and camera are moving to the PC, with video editing, and mailing or streaming of video sound and still images. The TV could be a base for this, but the PC is the only platform currently capable of handling the tasks, and of being upgraded by the user.

Some companies see no short term future for interactive television beyond enhanced teletext. The PC and high-speed Internet with powerful interactive and multimedia applications, a platform that is flexible for innovation, and a user group open to change is a more attractive avenue for technology and service development. With low cost Internet and PCs, the market need for alternative cheap interactive terminals becomes less obvious. In the same way that television sets have multiplied, PCs are multiplying - it is now possible for a household to have several computers, for example, one for the adult's work, the other for the children. At the same time, the market for Web-on-TV products has been rather slower than anticipated. WebTV, NetConnect and many others were launched and relaunched with great expectations, but failed to find buyers. WebTV sold 250000 units in 1996/97, against millions home PCs.

However such a negative view does not take into account the efforts of those who produce web-sites and Internet technology to innovate to develop new markets. Broadcasters currently putting huge investments into making programmes and schedules to attract a range of viewers, good enough to stop viewers surfing to another channel, and making sure they tune in again. Web publishers must do the same thing if they are to start building a strong user profile to plan future programmes on and sell to advertisers. As some sites become more professionally and imaginatively developed, and the technology advances to make more possibilities, they can have much greater value as interactive products or services - the main use of the Web will almost certainly cease to be surfing, and centre on interacting with particular services and content. These services will be much more useful and engaging than most that exist today. These sites can be designed specifically for individual use, or group use, or open - the technology is not the restriction, it is the content design and the use context. First generation technology and content has been mainly predicated on individual use. Despite its success, innovators and users are discovering the attraction of collective and social uses, and a second generation is being developed. This is more open, facilitating multiple users, either on the same terminal, at terminals side by side as seen in cybercafes (Stewart 1998), or over the Internet and other networks.

Changes in Internet technology, particular towards video and audio streaming and downloading bring attractive new services and ways of using the television, as it becomes integrated as the centre of a 'home entertainment system' that includes the computer and music technology. Web-on-TV may also be able to piggyback its way into the home on digital television, but it is impossible to say at the moment if will enter the home as part of a package that adds value for service providers (such as banks) or as a value added product for end users.

Further down the line it is uncertain if we will be able to speak of the 'Internet' and the 'Web' as standards, networks, and services are increasingly fragmented across a heterogeneous market. More 'TV-centric' technologies and services, such as video on-demand, may become economic and relevant to the TV viewer, and other services will move to other terminals around the home, where they are more useful, or controlled by another service provider.

7 Conclusions

This paper suggests that the innovation environment for Web based interactive television is different to previous version of interactive television, where projects were controlled by companies, and interactive television had no precedent. Now many of the services promised by i-TV are available to end users, who are using them on the PC at home or at work. This is a huge resource for companies, and should make the development of i-TV much easier. However it also focuses attention away from the television as an interactive platform, and onto new platforms which are becoming more and more available. It also reduces the amount of control developers have over the adoption environment, and forces them to focus more on end-user needs and emerging requirements.

In the process of development of interactive television we have seen technology based companies move from one technical system to another, but continually focused on the television set as the principal pole of attraction. The users have not been involved in the innovation process, and have not been able to express their interest in interactive services or systems through purchasing and using at home. With the development of the Internet this changes. The Internet has become the an important pole of attraction for users, and following them, developers of interactive television.

A brief survey of the way that television is used, and the way the Web is used, points to the weakness in current content, as material to be delivered and used by many television users, but also shows that television is used in many more ways now, that could

accommodate a significant market in individual, information and communication based uses.

Extrapolating from the current rate of social, cultural and technical change in new media, we can safely predict that there will be an enormous difference between current Web content and future offerings. Already the Web interface is becoming a front-end for multimedia such as video and audio, communications systems such as chat, and e-mail, and Java applets, and sophisticated server-side systems offer really interactive applications¹⁹. Radically new products will appear, and some existing products will solidify as the market evolves, infrastructure investment reduces the bandwidth bottleneck, and 'creative' people are given the tools and commercial space to experiment. For the moment we can only use the content that is available, which is weak in products designed for group use and really engaging interactive content. This will certainly restrict uptake in the short term, but as the supply side develops a more varied range for products for the television viewer then it seems reasonable to take an optimistic view, and predict that Internet connections to the television, through cable or wireless will become as common as broadcast television. However for this to happen, i-TV producers, programmers and engineers, be they designing for i-TV or the Web used on the television, must understand and design for a broad range of users, and contexts of use, and respond to the market as we slowly integrate interactive products alongside television and other new media in our everyday lives.

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¹⁹ Including all the types of interactive systems: information browsing, information search, entertainment, communication, and task performance. For example, Elizabethan insult generators (<http://www.tower.org/insult/index.html>), buying goods and services (<http://www.iflybritishmidland.com/>), personalised push-technology news updates (<http://www.pointcast.com/>), insurance quotes and personalised advice (<http://www.skinet.com/ski/>), etc.

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