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The Mobile Phone: a hybrid multi-platform medium

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ABSTRACT

In this paper we argue that the mobile phone must be considered both in terms of telephone functionality, and as an emergent entertainment media interface. As services based upon telecommunications – mobile telephony, the internet, video-on-demand, personal video recorders (PVRs), interactive television (iTV) – become progressively experienced as everyday media content, the environments of information and communication merge. We suggest that the mobile phone is enabling new ways of engaging with media content, and new ways of negotiating and communicating within both actual and virtual environments. In particular we consider the specificities of the mobile phone interface, and then turn to one of the most interesting and emerging areas of mobile phone-enabled entertainment – location-based and multiplayer games.

1. INTRODUCTION

Portable media devices are becoming both increasingly ubiquitous and personalised, penetrating and transforming everyday cultural practices and spaces. In their ever-presence, such devices further disrupt distinctions between communication and media creation, person-to-person and telepresent interaction, and actual and virtual environments. Functionality ranges from the standard mobile phone to highly sophisticated multimedia hybrids, personal digital assistants (PDAs), MP3 players, personal media centres and handheld networkable game consoles. No other screen or communications medium – except perhaps in some respects for current and upcoming versions of the handheld game consoles Nintendo DS and PlayStation Portable – has the combined properties of wearability, self-activation, individualised media content, image and data manipulation and archivability, location-based networking, and telephone and web accessibility. In their separate studies of the mobile phone, both Sadie Plant and Paul Levison observe that the mobile is often used – or will become – the primary means of Internet access [14, 10]. The multi-functionality of the mobile phone, together with high-speed wireless third generation (3G) and Wi-Fi (wireless fidelity) networks, and the adoption of Internet protocol technology, means that both mobile phone carriers and makers of handsets are poised to move beyond the voice market and into that of digital content provision, aggregation and creation. Moreover, it is increasingly claimed in both academic texts [2, 7], and popular

media news forums such as Gamasutra's *MobileGameNews.biz*, that today's mobile multi-platform hybrids are disrupting what has previously been considered the domain of the entertainment industries, TV and large screen interfaces, including music, games and cinema.

In this paper we propose that mobile multimedia devices should be examined both in terms of their mobile phone functionality, and in their own right as nascent new media forms. Significantly, over the past two decades many of the distinctions between mass media and communications technologies have converged to become 'network media'. As internet-based services are progressively experienced in terms of everyday media content provision, the spaces of information and communication become genuinely merged. Such a shift means that 'audiences' become 'users'. We suggest that in this user-driven context, the mobile phone as networked mobile media device is – in its own right – giving rise to both new ways of engaging with media content, and new ways of interacting with actual and virtual interactive environments.

The traditional logic underlying media theory considered every media object to be assembled in some kind of media factory (like a Hollywood studio), such that multiple identical copies produced from a master could be distributed to those with access to the medium; broadcasting, film distribution, and print technologies all follow this logic [12]. In a new media environment – via programmable, personalisable, interactive, hybridised, convergent and networkable technologies – rather than media objects being made available to mass audiences, individuals are increasingly micro-targeted: film and TV productions now engender multiple media manifestations (value-added websites, interactive DVDs with extras and games, customised mobile content); every visitor to a website can view their own custom version created on-the-fly from a database; personal digital video recorders enable television consumers to pre-programme their own 'niche-TV'. The mobile handset and portable console are also devices residing in this nexus between communication and information: one's child can be kept busy during a long drive watching *Robots* or playing games on Mum's Nokia; video and image content can be captured by the mobile's inbuilt digital camera, automatically edited into a personal documentary by onboard editing software, and either transmitted to friends around the world, downloaded onto a computer or viewed on a domestic TV set or home theatre system.

To date key new media texts have not engaged explicitly with the mobile phone, pocket computer or game console as ‘new media’ with their own specificity. In texts which do include chapters or articles on mobile phone use, the mobile is considered primarily as a voice or text transmission device, with no account of its emergence as an interactive digital medium [13]. However, there are some notable exceptions, some of which include Goggin’s [4] discussion of ‘the aural irruptions of customised polyphonic ringtones’ within contemporary soundscapes, Plant’s [14] various references to mobile-based artwork and the staging of an orchestrated collective ringtone symphony in London, and the trajectory Levinson [10] traces between the mobile camera and mobile phone. Articles from both industry and academia available in online industry-sponsored magazines such as *receiver* (<http://www.receiver.vodafone.com>) and *the feature* (<http://www.thefeature.com>) also consider how the current mobile media environment has evolved far beyond the basic provision of information and voice/text transmission services. It is clear that this transformation requires a critical approach which views mobile media as more than telecommunications tools, but also as hybrid interfaces within a multi-platform or trans-mediascape: that is, the mobile phone as a new and interactive media form. In what follows we will first consider the specificities of the mobile phone interface, the concomitant specificities of mobile user-types, and then turn to one of the most interesting and emerging areas of mobile phone-enabled entertainment – the location-based and multiplayer game.

2. THE MOBILE PHONE AS NEW MEDIA INTERFACE

Considering mobile phones/media in terms of their own specific effects, implicitly assumes the much-used media theory concept of medium specificity. Although some might question whether medium specificity is still a central concept at a time of digital convergence, we argue that while media in general will become increasingly multi-platform, each platform delivers appropriate and unique content, and with the mobile phone as an integral component of delivery. Thus, for example, by organising data in particular ways, various interfaces may appear simultaneously or separately within the mobile screen or as audio content, but each mode of engagement (talk, text, email, micro-browsing, gaming, photography, word processing, etc.) will nevertheless still privilege particular corporeal attitudes, social agencies, and modes of (dis)engaging from both telepresent and immediate environments.

The application of medium specificity to new and supposedly convergent mobile media is also sustained by Bolter’s and Grusin’s [1] new media concept of remediation (which in some respects is an effective reworking of McLuhan’s ‘laws of media’ [11]). In their collaborative work *Remediation: Understanding New Media* Bolter and Grusin suggest that this process is complicated by the way that contemporary digital media ‘remediate’ already mature cultural forms and vice versa, either by appropriating and integrating aspects of older media, or incorporating new media developments. For example, the mobile phone ‘remediates’ both photography and home video by rendering their transmission between geographically distant places all but immediate. Moreover, remediation questions the notion that the latest technologies are ‘new’ by showing how their technical and cultural trajectories are partially set in place by

previous technologies. Thus the telegraph, in severing communication from physical transportation, opened the way for our experience of — and foregrounded our familiarity with — today’s more sophisticated telepresenting media. More recently, icon-based navigation on the mobile or PDA screen remediates the user-friendly desktop interface.

In a number of respects the evolution of the mobile multimedia device has emulated that of its ancestor: the desktop personal computer. In many ways mobile devices currently suffer the same restrictions of processing power, hard-drive space and network bandwidth that substantiated the limitation of entertainment value experienced on personal computers in the early days of the World Wide Web. That is, when digital connectivity is of low data-speed, content defaults to simple, low bandwidth communication in the way of text, simple images and audio. Return channel interactivity is also minimised in this model to economise on data throughput. Recognising this similarity between the two mediums can then provide a useful template with which to predict the future metamorphosis of mobile multimedia devices, with the primary difference being that of mobility.

While this is the case it is essential to also recognise other characteristics of mobile devices that help shape the mobile entertainment experience. Consider, for example, the Nokia N-Gage, which has been designed primarily as a mobile online gaming device that also serves as a wireless phone, digital music player and radio. The physical nature of this device is such that it enhances game-play by arranging the buttons and screen to more closely resemble dedicated mobile gaming devices such as the NintendoDS and PlayStation Portable. The ergonomics of the device as a game console is improved by this, but in return a compromise is made in terms of phone functionality – it is somewhat awkward to hold to the ear and in its shape and usability doesn’t ‘behave’ like the more familiar and conventional flip-top or candy bar phone. In short, it’s a game device that is also a phone. The merging of this functionality reflects the complex remediation between game and communication interface that is emerging from mobile media devices.

It is clear that Nokia have taken this ‘remediation’ approach in designing much of their mobile device range: that a mobile multimedia device must be a compromise between a multitude of convergent media acquisition methods and experiences. The Nokia N-series contains half a dozen phones that consist of various qualities and incarnations of what is virtually the same product. All the phones enable wireless telephony, still image acquisition and reviewing, audio acquisition and reviewing, video acquisition and reviewing, digital music playing, game-playing and more – and yet they are each designed and marketed towards a particular ‘user’. For example, the N93 features high level optics, a twisting screen that resembles a viewfinder and advanced editing software and is aimed at the budding video-maker, while the N91 supports mobile music appreciation with its generous hard-drive space, FM radio and advanced stereo headset. In devices that are designed specifically to enhance the user’s experience of a particular kind of media content and modality, mobile gaming must find a compromise. With various mobile multimedia device functionalities supporting a range of media forms to different degrees, it is useful to briefly identify what these are and examine how they affect the user’s entertainment experience of media content. This will also assist us in clarifying

the specificity of each device that exemplifies the associated characteristic.

As mobile devices evolve the most obvious manifestation of technological improvement (apart from colourisation) is the quality and resolution of the screen. While having a profound effect on entertainment functionality, and also mirroring the maturation of the desktop computer, these improvements are not medium specific. The mobile device, being in part hybridised from the land-line telephone, and initially only seen as a device for communication, emerged with a screen that did not necessitate the ability to display video images – only numbers.

As the mobile phone LCD screen matured it became apparent that it could, and would be useful to, display more information on the screen simultaneously (time, date, service, etc.) and so the screen began appropriating more of the interface real-estate. Current models exhibit design characteristics that see the screen employing as much space on the device as possible (without intruding on that required for buttons). Thus the mobile device has had to 'make room' for media, according to the shift from communication-only to media content and delivery. We would argue that it is not the case that media content/creation is superseding communication functionality, but rather that what is emerging is a complex merger of a number of different modalities of interaction, and varying combinations of media and communication. Such hybrid practices are evidenced by the use of one's personal mobile phone as a photo documentary archive, the practice of 'moblogging' (updating photo and text blogs via mobile phone), or the popularity of mobile phone photography exhibitions such as HP's *Mobile Moments* and *Cellph Portrait* held in San Francisco (<http://www.rxgallery.com/>).

The main criticism when experiencing media on a mobile device has always been the size of the screen. The premise for this existing as a problem for viewers rests with a concept called 'viewing ratio'. Viewing ratio is the size of the screen in relation to the distance of the viewer to the screen, while also being dependant on screen resolution. To put this in perspective, analogue television sets have an ideal viewing distance of 7 times the screen size (i.e. just over 2m for small sets) while PC screens have an ideal viewing distance of about 2 times screen size. The higher resolution of the PC screen makes it easier to sit nearer and not be distracted by pixelisation. It also allows the user to play small windows of video within the larger landscape of the PC screen and still appreciate the content. This is of particular relevance to game-play, where image clarity is fundamental to an immersive game experience.

In debates surrounding the delivery and reception of media content on mobile phones and devices, the TV-watching 'resolution vs viewing ratio' paradigm has seemed to suggest that we cannot enjoy video on a mobile-sized screen. Yet it is not only the size of the screen that is a problem, it is the resolution – and the resolution of a TV screen is very low (720 x 576 for PAL) – even compared to that of mobile phone screens. Indeed, as the resolution of the mobile phone screen improves we are beginning to experience more supply and demand for video and high resolution entertainment. The real obstacle that needs to be overcome in our mobile enjoyment of this entertainment is the physical relationship between the device and the user: holding a device in your hand up to your face does not facilitate a

temporally extended or extendable entertainment experience. Just as Windows Media Centre strives to resituate the networked computer as a sit-back entertainment technology, we would suggest that mobile devices may soon herald a new culture of visual and immersive experience through emerging eyewear technology.

Video eyewear, such as the Icuiti DV920, is a light and portable glasses-type technology that connects to a portable device to display images on a micro-LCD screen directly in front of the user's eyes. The eyewear clearly remediates a 'cinematic' experience by projecting the image into a dark space, and this also serves to assist in the immersion of the user and their engagement with the particular media content. Clearly much more research needs to be done in the area of video eyewear to determine the ergonomic usability and cultural implications of this type of device, but it could potentially quite radically change the specificities of the mobile interface. In light of the discussion on screen ratio it is pertinent to recognise that mobile video eyewear does not need to conform to any physical properties of the mobile phone itself when determining its screen dimensions. It can thus adapt, in the fashion of a desktop computer screen, to a variety of screen ratios and possible window arrangements as resolution of such devices improves. This will serve to relinquish constraints on the design and implementation of entertainment media for mobile devices in the near future.

The emergence of video eyewear will also alter the mobile input interface. Currently most mobile devices rely on buttons to allow users to input text or numbers for communication and information purposes, while other buttons or pads may exist for playing games, responding to incoming phone calls, assisting in navigation of software menus and more. As pushing a button requires the user to be aware of its location, much thought has gone into designing and positioning buttons on mobile devices for ease of use in specific applications; for example the inclusion of a full QWERTY keyboard to allow PDA-style interaction. Most contemporary mobile phones, however, favour the numbered keypad for ease-of-use in the compromise between design and functionality. Such compromises are specific to mobile devices in that their size must be kept to a minimum while retaining optimum usability for a particular media user. It is becoming increasingly apparent that specific media/entertainment needs are best facilitated with a redesigned interface – hence heralding not a convergence, but a *divergence* of utilities and functionality and a consequent proliferation of handsets.

As previously noted in relation to the Nokia N-Gage, the positioning of the buttons is also very relevant to facilitating game functionality. Currently many mobile phones make use of their existing buttons and screen/button format to enable game input. While not being totally inadequate for game use, the design of the mobile phone keypad does not intuitively facilitate good game-play. In the first instance the keys are grouped very closely together, making it difficult to choose the correct navigational or action button by feel while focusing on the screen. Although the menu navigation system on a mobile phone might seem to provide a perfect game navigation arrangement, mobile phones are designed to be used by left and right hand alike, so the navigation buttons are located centrally on the device. As exemplified by the Nintendo, PlayStation and XBox range of handheld game devices, console remotes and hand controllers, this is not ideal for

'handling' a game controller. i.e. more sophisticated and nuanced game-play is afforded by a controller with non-symmetrical button functionality, or as in the case of Nintendo's new *Wii* system, a different controller is provided for each hand.

The touch-screen is another ideal example of the emerging specificity of mobile handsets as new media interfaces. Utilising a technology that is prevalent in tablet PCs, mobile phone/PDA devices such as the Motorola A1000 attempt to capitalise on screen size by removing as many physical buttons as possible and incorporating them into a touch screen interface. The A1000 can provide a touch screen phone dialler that can be used with a finger, a full QWERTY keyboard that must be used with a stylus, and a stylus-based handwriting recognition pad that can store notes as handwriting or decode them into typed text. The text input functionality of such a device is useful for business applications such as scheduling, note-taking and emailing – and in doing so provides a stylus-based interface not unfamiliar to those accustomed to employing pen and paper in their working environment. The clash of functionality and culture, however, is evoked when considering more socially centred activities. For example, with the A1000 a user cannot easily SMS message while walking – the accuracy required when using the stylus on the touch-screen is too high in this instance. So the one-handed functionality of the mobile phone is lost in favour of PDA functionality. Nevertheless the viability of the touch-screen for gaming has been proven by the success of the Nintendo DS, pointing to the need to carefully consider how to effectively combine the convergence of communication and game functionality.

Of course, the primary and unique element of mobile media and communication devices is that of wireless connectivity. Without the ability to transfer data or information while mobile it is merely a portable game, video or audio device (such as the Nintendo GameBoy or the iPod). The mobile phone's analogy to desktop computers continues here in the context of bandwidth – or data flow – which has increased steadily over time to metamorphose the mobile device from a mere communication medium into a mobile entertainment centre. Though we are currently enjoying increased access to data in the form of audio, videos, games and the internet, at this time in countries such as Australia we are still considerably restricted by low bandwidth, which prevents our mobiles from becoming 'an internet in our pocket'. Mobile connectivity is a convoluted many-headed monster that includes 3G, Bluetooth, WiFi, UMTS/HSDPA, WiMax and more, with the ultimate goal being completely transparent and pervasive high bandwidth mobile connectivity. Put simply, what these services will allow is the bringing together of high bandwidth connectivity and mobility; for future mobile device game design, creation and experience, this goal defines the true specificity of this technology – that of mobility with high speed, transparent and unrestricted connectivity.

Mobile new media interfaces are also significant players in the shift from the traditional analogue paradigm of broadcast entertainment to user-driven and 'microcast' media content. One of the most significant manifestations of digital media is the way users have been empowered to 'cast' content that they themselves have created or helped create. In her paper 'Mobile Art' presented at the Biennale of Electronic Art Perth in Australia (<http://beap.org>), Lisa Gye [5] described the supersession of

wireless application protocol (WAP) with I-Mode technology (an always-on wireless internet platform recently launched by DoCoMo in Japan), which enables individual users to participate in a 'distributed aesthetics' by xml-coding their own mobile phone content, rather than simply downloading existing content/services; she reports on the creative media agency *the-phone-book limited* (<http://the-phone-book.ltd.uk/>) which provides workshops, downloadable freeware/shareware and code generators for mobile phone content. We would suggest that as bandwidth restrictions subside we will potentially experience an influx in media that reflects this interpersonal engagement and interactivity with media; as mobile users we will shift from the position of audience/receiver to participant/creator. In terms of desktop computers we have already witnessed this with the explosive growth of video repositories such as Youtube, personal social networks like Myspace, and massively multi-player online role-playing games (MMORPGs) like *Everquest* and *Eve Online*, and virtual worlds such as *Second Life*.

These media forms become quite significantly transformed and remediated when made available through a mobile device with location-sensing technology, where the physical position of a user can be broadcast to all other mobile or fixed devices. Location sensing technologies use several methods to determine the physical location of a device user, including satellite triangulation positioning (Global Positioning System - GPS) and GSM cell network positioning. Fitted with this technology any device can potentially calculate and report to the user its exact position on the planet's surface to within a centimetre. This information is of particular interest when the device itself is mobile and interconnected as updated location information can then be made available to other moving interconnected devices. Thus what the mobile internet will provide is not only the merger of communication and media, but the added facility of mobility, which has given rise to the massively multiplayer mobile role-playing game (MMMRPG) and the location-based game (LBG).

MMMRPGs combine the massively multiplayer online role-playing game (MMORPG) with a location-sensing mobile communication device. This emerging genre of computer games has been labelled 'pervasive gaming' – one of the first commercial examples of its kind being a MMMRPG called *Botfighters* [3, 15]. Pervasive games are based on three convergent technologies; mobile devices, wireless networking and location sensing [2], and are often described as a bridging of the digital and the physical. They require the player to adopt a virtual character or position of play while negotiating a real physical space in order to participate in the game. As such, the MMMRPG is truly a game specific to mobile communication and networked devices such as mobile phones.

In terms of the seemingly committed practice of game-play, it is sometimes argued that mobile phone engagement is characterised by interruption, and sporadic or split attention in the midst of other activities, a behaviour quite distinct even from handheld console game-play on the Nintendo DualScreen (DS) or PlayStation Portable (PSP). This is recognised by the growing mobile phone game industry and its labelling of a key market as 'casual gamers', who play at most for five minutes at a time and at irregular intervals; clearly, the argument goes, mobile phone gamers don't want immersion [8]. Yet the emergence of MMMRPGs and location-based games challenge the assumptions

behind the notion of the 90-second casual gamer. In other words, we need other descriptors of gamers – playing intermittently does not necessarily mean playing discrete/finite games, it can also mean cumulative gaming much like the on-going engagement typical of MMORPGs. Mobile game developers are increasingly aware of the specificities of the mobile phone in designing games specifically for the device, explicitly recognising what new game opportunities handsets allow — namely mobility, connectivity, camera functionality and GPS capability. Some location-based games such as Mogi (beta-tested successfully in Japan since 2003), for example, integrate virtual objects into the camera view, and require teams of players to ‘capture’ them at leisure, or whenever a player happens to be walking past a particular location in the city [6]. Such ‘mixed-reality’ games or next-generation mobile entertainment platforms, rather than creating an escape from ‘real life’ through screen immersion, work to integrate play and game interaction into the patterns of everyday life and work.

Current developments in location-based gaming via the mobile phone also instigate even more radical changes to the way we experience the relation between actual and virtual space. The players of Mogi and other location-based games quite radically alter their trajectories through the city, dynamically reworking the way in which they experience the physical and urban environment. A frequent player of the game, for example, describes how his trips to the city have become physically ‘randomised’ or diverted as an effect of the game, such that he gets ‘a chance to discover part of the city that I ignored, [motivated] to check out that parallel street I never took’ [6]. Again this experience is something only the networked mobile device can offer: the combination of online gaming, physical mobility, and the locatability of both player and game-play in the real world in real time. The game Backseat Playground, for example, enables children to ‘play’ with the world outside from the backseat of a car. Creator John Paul Bichard imagines a scenario where the physical environment becomes a ‘vast game engine’, and objects, places and people ‘part of an intertwining series of episodes’ [2]. Similarly, Justin Hall imagines a near future where ‘virtual data objects are scattered all over the real, physical world’ and mobile phones have tangible context-sensitivity [7]. As such, the game environment becomes a dynamic and open-ended blend of physical and virtual space, which is a far remove from the discrete and fixed experience of console and offline games, or even the virtual containment of MMORPGs.

In location-based mobile phone gaming the mobility of the physical body becomes key to game-play, and the mobile phone and body act together as feedback mechanism and avatar within the combined actual-virtual space [9]. The body is not represented in the game (as for example in the point-of-view or over-the-shoulder style of console and computer games), it is *in* the game, and the game *in* the world, enacting a seamless continuity between the virtual and the physical, and conflating the vicarious link between body and avatar. Moreover, as theorists and developers such as Terry Rueb [15] and Hall [6] suggest, location-based mobile games have the potential to habitualise a new range of gestures and movements that bypass the current room- or seat-based restrictions of digital gaming. The elements which would combine to create such next-generation environments are mutually contingent negotiations between actual

and virtual domains — that is, not only can virtual objects be implanted into actual environments, but one can more radically envisage that widespread use of such platforms may eventually effect changes to architectural design and the planning of urban spaces. As such, we might see emergent actual-virtual environments of a kind never before experienced in such a collective and interactive fashion. This kind of interaction is specific to the mobile – it is what the mobile device in its specificity enables and *allows*.

3. CONCLUSION

As we have argued, the mobile phone is emerging as a significant new media form which will surely transform the way we watch, play and engage with entertainment media. The mobile is a hybrid multi-platform medium that combines or remediates a varying assortment of functions, interfaces and content. It is thus important to consider not the convergence of functionalities and content provision in the mobile device, but the specificities and divergence of user-types, and the particular perceptual and design ‘biases’ across the range of services and handsets. In particular, a nuanced appraisal of the media modalities that are enabled by mobile phones is needed to critically understand the emergence of both new forms of entertainment and game-play, such as LBGs and MMRPGs, and new ways of interacting with actual and virtual environments in contemporary technoculture.

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