FCJ-084 Who's Afraid of Technological Determinism? Another Look at Medium Theory

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The model of medium theory, proposing that the most significant cultural and social effects of media derive from the intrinsic properties of the media themselves, has historically been viewed with suspicion within studies of media and technology, especially on the critical Left. An extensive literature drawing on political economy and critical sociology has denounced the technological determinism inherent in medium theory, advancing instead a 'social shaping of technology' thesis.

However, the impact of digital information and networking provokes a reconsideration of the model of medium theory. Every time it is written or stated that digital convergent technology has re-shaped the use and effects of media forms, then some form of medium theory is being employed. Such widespread informal reference to the tenets of medium theory – including an element of technological determinism – makes a reconsideration of the model timely.

In this paper I assess the strengths and weaknesses of medium theory as a model, re-evaluating the charge against it of technological determinism. I consider the possibility that the ramifications of digital networking in media, communication and entertainment require a theoretical model more attentive to the intrinsic properties of technologies than is evident in much critical theoretical analysis of digital culture. I propose a theoretical model concerned both with the social-economic context of new media technologies and with the properties of those technologies themselves.

First, however, it is necessary to summarise the characteristics of the model of medium theory. I then consider the criticisms leveled at this model, including the various critiques of technological determinism. I review some of the alternative models of technology and culture that have been proposed in opposition to a technological determinist perspective, including actor-network theory. I assess the relative merits and weaknesses of these models, before turning again to medium theory in the age of digital networking and convergence. Is there more value in this much-maligned theoretical model than has generally been surmised?

The Medium Theory Model in Western Thought

Medium theory foregrounds media technology, identifying the cultural impact flowing from the properties inherent in technologies. The model also asserts the specificity of each medium and its technology. In media studies and the theoretical evaluation of technology and society, this model has claimed a profile since the 1960s, but it is possible to find scattered antecedents in Western thought. Around 370 BC, Plato warned in the Phaedrus that writing was the debasement of memory, the degradation of thought. In 1882, Nietszche wrote of the typewriter: 'Our writing instruments contribute to our thoughts' (Kittler 1990: 195). These two giants of Western philosophy, at variance in many other ways, and separated by two millennia, pointed directly to the structuring effect on consciousness of media technology; yet this perspective has retained a minority status in philosophy and critical thought.

With a few rare and notable exceptions, philosophers have not reflected on the fundamental role of literacy, or of the printing press and other technologies of media, in their intellectual pursuits. In part this may well be because their life's work has been so shaped by the properties and potentials of the written word that they lack the perspective, and the desire, to consider themselves as so determined. As a result, Plato's denigration of writing has seemed to many professional thinkers a puzzling aberration, akin to his proscription of poets: a strange anomaly which separates him from his modern readers. Typical of this response is Walter Hamilton's introductory remark in the Penguin edition of the Phaedrus: 'The dialogue ends with a condemnation of writing as a means of communicating knowledge which cannot fail to ring oddly in the ears of a modern reader' (1973: 10). Derrida's well-known deconstruction of Plato's critique of writing is a concerted attempt to salvage writing from its alleged repression. All Derrida's metaphors and devices – 'trace', 'supplement', 'arche-writing', 'grammatology' – are resolutely drawn from the written text; yet there is a curious absence even in Derrida of reflection on the shaping force of the written (technologised) word on deconstruction itself.

An analysis of the intellectual consequences of writing as a technology has been conducted by Eric Havelock in his Preface To Plato. Havelock contends that Plato's proscription of poets in The Republic is ultimately concerned with the conflict between oral and literate sensibilities. Despite his professed hostility to writing, Plato is in fact fully molded by the properties of literacy. His banishment of the poets is his rejection of the oral tradition, expressing his attempt to replace the orally created and transmitted epic poems with philosophy as the true educator of Greece. Literacy enables the objectification of knowledge, even the objectification of the self as an object of study; it enables thought to conceive of concepts, such as the Forms, which exist outside concrete reality. In Havelock's view, the literate Plato – preferring logic to narrative, the abstract to the concrete – usurps the oral Homer as the educator of Greece.

10 It is possible to compile a list of writers, since the second half of the twentieth century, who have expounded the media- technologies-effects theory. It is a multi-disciplinary list, and includes, apart from Havelock: Harold Innis, Marshall McLuhan, Jack Goody and Ian Watt, Walter J. Ong, Elizabeth Eisenstein, Friedrich Kittler and Joshua Meyrowitz. These theorists range across diverse fields of study; the strength of the proposition varies throughout their works. But the basis of the proposition is constant: as media technologies change, profound cultural effects ensue. These effects operate on both the level of the individual psyche and the social formation as a whole. The effects may be observed in the long historical span of inventions from literacy to interactive multimedia.

11 The advent of the written word, and its effects, has attracted the attention of several theorists, all insistent on the profound consequences wrought by the transition from orality to literacy. Ong maintains that: 'More than any other single invention, writing has transformed human consciousness'. (Ong 1982: 78). Goody, who developed the notion of 'intellectual technologies', asserts that writing creates 'a different cognitive potentiality for human beings than communication by word of mouth'(1977: 128, cited Tofts and McKeich 1997: 46). For Ong, writing is a 'secondary modelling system' (8); it is dependent on the prior primary system, spoken language, yet it fundamentally transforms the potential of language. The written word becomes the bearer of information, acquired by the visual sense. The shifts in consciousness made possible by this invention include the development of analytical, rational thought, the cultivation of artificial memory, of precision, linearity, abstraction.

12 Eisenstein (1979) has conducted an extensive analysis of the printing press as an 'agent of change' with major ramifications in politics, science, economics, even exploration (Murphie and Potts 2003: 12). Meyrowitz (1985) is largely concerned with the social and political impact of television; his scholarly account reveals numerous consequences stemming from the intrinsic properties of this technology, which has always favoured emotion and spectacle over argument and reason.

13 This brief account of some of the major exponents of medium theory has sketched the range of technologies to which it has been applied. I have not yet dealt with Marshall McLuhan, easily the most well known (or infamous) proponent of this model, and certainly a self-avowed technological determinist. McLuhan's dictum 'the medium is the message' popularized the theory of medium specificity and effects in the 1960s; in the late 1990s he was anointed (by Wired magazine and other digital enthusiasts) patron saint of the digital age, in which many of his predictions – it was claimed – were realized. An overview of his arguments concerning media and technology is an appropriate means of addressing the tenets of medium theory, and of evaluating this model in the context of contemporary digital media.

The Characteristics of Medium Theory

14 McLuhan's articulation of the model is at once the most succinct and the most bold of all its exponents; he is also (like Baudrillard after him) deliberately provocative in his statements. For McLuhan, all media, including print, invest our lives with artificial perception and arbitrary values; the message of any medium is 'the change of scale or pace or pattern that it introduces into human affairs' (1974: 16). Each new medium of communication alters the 'patterns of perception steadily and without any resistance' (1974: 27). Each medium alters the sense ratios of perception; this relates to both the act of individuals' engagement with the medium, and the hierarchy within the human sensorium in different historical epochs. This hierarchy of the senses is shaped by the dominant media forms of the time, such as print or electronic mass media. Thus the primacy of sound in oral cultures gives way to the primacy of vision under literacy. Corresponding to this shift,

the means of attaining information is also altered. The collective audience of listeners in oral societies becomes an 'agglomeration of individuals' in literate societies: atomised readers.

15 The radical and most challenging aspect of the theory resides in the idea that the technology of any medium will affect the cognitive functions of those who use it. The electronic mass media were the focus of McLuhan's prophecies: for him they constituted a shift away from the cultural conditioning of print, and its products linearity and rationality. For the like-minded but more cautious Ong, electronic media represent a 'secondary orality', a return to a greater communal sense and concentration on the present moment. Most recently, exponents of a 'Digital McLuhan' such as Paul Levinson (1999) have considered digital media as the latest intellectual technology to modify the 'cognitive ecology' into which it has been introduced. The 'global village' announced by McLuhan as the cultural effect of electronic media and the satellite, becomes the virtual global village in the age of digital networking.

16 The weaknesses of medium theory as espoused by McLuhan are readily apparent. McLuhan prophesied the global village, but he had nothing at all to say about ownership, control or regulation of that village. He proclaimed that the medium is the message, but he had no interest in the content of that message. He could assert that radio created Hitler in Germany and the teenager in the US, but he allowed no role for the economic, political and social factors which most scholars would consider crucial to such historical processes. Accordingly, no-one could claim that a theoretical approach as blithely single-minded as McLuhan's could constitute a well-rounded media theory; however, that is not the point at issue. I contend that despite the evident flaws in McLuhan's one-sided model, a focus on the intrinsic properties of media comes closest to revealing the most profound and long-term cultural effects of those media. These are also social and political effects, operating on a deeper level than those assailed by political economists or critical sociologists.

Critiques of the Model

17 McLuhan's sweeping generalisations and epigrammatic style leave this theoretical approach open to criticism, as does its technological determinism. There is no doubt that McLuhan, and his more scholarly successors, define cultural history by technological change, in their case the changing technologies of communication. This was certainly the thrust of Raymond Williams' critique of McLuhan: 'the medium is the message' he argued, is such a reductive formalism that all other causes apart from the medium – 'all that men ordinarily see as history' – are reduced to mere 'effects' (Williams 1975: 127).

18 There is an impressive literature devoted to the critical theory of technology. This approach has drawn on political economy (ownership, control and regulation of media industries); critical sociology (notions of ideology, hegemony, power and consensus); feminism; audience theory; textual analysis (semiotics, theories of representation); and most recently, post-structuralism (deconstruction, theories of the post-modern). In foregrounding the political and economic decisions underpinning technological development, this literature is a valuable antidote to the doctrine of progress – 'we have no choice' – which has been invoked in the cause of technological development since the nineteenth century. This critical approach refutes the removal, in technological determinist accounts, of technologies from the social contexts which shape them. 'The social shaping of technology' – analysed in detail by MacKenzie and Wajcman (1988 and 1999) and other theorists of technology – is the approach favoured in the critical theory of technology and media.

19 Williams' study of television, which specifically engages with McLuhan's writing – is a prime example of this approach in the field of media studies. Rather than accepting television's advent and the shaping of societies in its image – 'the TV age' – Williams is concerned with the social needs which were met by the development of radio and TV. Specifically, there was a primary need to connect the domestic space of family homes to large-scale urban communities. As well, Williams analyses the complex of Government policy-making and corporate economic interest which controlled broadcasting, in varying alignments, around the world.

20 Such a critical account opposes the generalisations of medium theory; it also resists the notion of inevitable social effects ensuing from specific media technologies. There is no question that medium theory requires a dose of social perspective, as contained in such accounts, to offer a

satisfactory theory of media and society. Indeed, Williams fills in all the factors McLuhan leaves out: social need, economic interest, political control, specific decision-making, the design of content: in a word, intention.

21 Much medium theory ignores intention because it have no interest in the social shaping of technology. Nor does it concern itself with how and why various technologies came to exist: its sole aim is to describe the socio-cultural effects of media technologies. Accordingly, the most pertinent criticism afforded by the sociology of technology relates to the role played by new technologies in social change. Does a new technology generate inevitable consequences, or does it merely introduce one factor into a matrix of factors? The standard response to this question from within critical theory is this: a new technology merely opens a door; it doesn't compel one to enter. (MacKenzie and Wajcman 1988: 6) Technologies don't determine; rather, they operate, and are operated upon, in a complex social field. It is the way technologies are used, rather than any intrinsic properties of those technologies, that is crucial. The case studies collected in MacKenzie and Wajcman's The Social Shaping of Technology demonstrate that technology and society are 'inextricably' connected, as the editors of this volume assert, and that the historical process is normally so complex that 'no single dominant shaping force' can be isolated as determining (1999: 12, 16). The role of the military, corporate research and development, and ideological factors concerning gender and race all figure in the complex of technological development.

22 A more polemical stand against technological determinism is taken by Leila Green in her book Technoculture (2002). Dismissing technological determinism as one of the 'myths' of technology and 'the old way of looking at things', she installs in its place a 'social determinism', arguing that 'society is responsible for the development and deployment of particular technologies.' Breaking the abstraction of 'society' into more specific components, she proposes that technocultures reflect 'the choices of elites in our societies, the people who have most say in how we plan for the future and how we allocate our resources' (2002: 2-3). With specific reference to media technologies, Brian Winston in Media Technology and Society approaches media history from a cultural materialist perspective: that is, his method is aligned to that of Williams rather than that of McLuhan. Winston's approach to media history runs counter to the medium theory model, in that his starting-point is the 'social sphere…conditioning and determining technological developments' that made various forms of media possible (1998: 2). Winston also moves beyond the 'lone genius inventor' model of technological innovation by focusing on the social necessities to which inventors – and other social agents – respond. Winston foregrounds government regulation and other 'supervening social necessities' (overlooked by most medium theorists) as crucial factors in the implementation and operation of media technologies. In media and mass communication theory, Dennis McQuail's influential book (first edition 1983, fifth edition 2005) is largely dismissive of medium theory because of its 'idealism' (identified in McLuhan's theories) and its 'media-centric' perspective (omitting socio-economic factors) (2005: 79, 102). Noting that it is not possible to provide 'proof' for McLuhan's ideas (127) or to 'test' Meyrowitz's assertions regarding the cultural effects of television (130), McQuail also makes the general remark that 'it is very difficult to pin down the "essential" characteristics of any given medium' (142), and that medium theory is therefore of limited value for researchers.

Medium Theory Responds

23 How does medium theory respond to such criticism? McLuhan, as we would expect, treats the social determinist perspective with open contempt. Such a response to media, 'that it is how they are used that counts' is, he thunders, 'the numb stance of the technological idiot' (1974: 26). Other theorists are more circumspect. Weak versions of medium theory argue for a concomitance of media change and cultural transformation, rather than a determining relation. Other versions treat the correlation of media and culture as a complex, rather than direct, engagement. Such approaches attempt to avoid the reductionism evident in medium theory at its most extreme (notably in McLuhan); this reductionism has attracted much criticism (as sketched above), contributing to the critical view that media theory remains a one-sided theoretical model.

24 A seminar held at the University of Bologna in 1993 addressed this issue, canvassing a wide range of medium theory variants from a semiotic perspective. One conclusion was that the effects of a new medium may be said to operate 'at the level of communicative relationships' between social actors; such an interpretation emphasises the reaction of 'historical actors to the communicative

problems created by the new medium itself' (Bernadelli and Blasi 1995: 11). In doing so, it avoids the abstractions of the strongest version of medium theory (McLuhan's).

25 Yet a difficulty remains with the various attempts of medium theorists to avoid the charge of technological determinism. Even a moderate-strength version allows for a 'pre-condition' for cultural change created by a new medium. Examples cited at the Bologna seminar included: '... Havelock's concept of alphabetic writing as a pre-condition for the development of western metaphysics and Eisenstein's theory of the printing press as a crucial agent of the Scientific Revolution' (Bernadelli and Blasi: 8).

26 It is readily acknowledged that a new medium opens up new possibilities, yet many theorists fear pushing this too far. They can see the historical door being opened, but they don't want to push the historical actors through it. Pierre Levy, in his otherwise freewheeling and utopian work on virtual technologies, sounds a note of critical caution in distinguishing '...causal or determining actions from those that prepare the way for or make something possible. Technologies don't determine, they lay the groundwork' (1998: 128).

27 This cautionary note, however, is swept aside in the prophetic rush of Levy's writings, which celebrate the transforming potential of digital networking.

28 The point I want to make is this: perhaps we should not be so afraid of technological determinism. Perhaps, in certain key instances, new technologies of media do more than open a door. Perhaps the technology of writing, or the printing press, or electronic mass media, or digital networking, bring with them such profoundly new possibilities that they do determine, at least in some degree, cultural effects. To create a pre-condition for cultural change is, after all, to allow for something to emerge that could not otherwise have emerged. This is the 'different cognitive potentiality' made possible by a different medium, and the way human subjects must engage with that medium. Indeed, Havelock considers Plato's philosophical breakthroughs – abstraction and objectivity – to be a 'historical necessity' in the wake of the fully developed literacy of the 4th century BC.

29 A new medium may re-structure human consciousness and its potential, by providing the means for new things to be achieved by that consciousness. This is the most profound impact of the invention of writing; and succeeding media technologies have created their own impacts on the potential of human communication. The shaping effects of a medium may be so powerful that the potential of new technologies may be obscured. The classic instance of this condition is the failure of Edison in 1877 to recognise the potential of his own invention, the phonograph. Completely missing its significance as a mechanical reproduction of sound and music, he thought it would make a good dictation machine – a secretarial aid. Jacques Attali considers an 1890 article by Edison, in which he criticises the use of the phonograph for the reproducing of music, to be an 'incredible text'; he points out that Edison did not realise the commercial potential of recorded music until 1898 (1985: 94).

30 The medium theory model provides an explanation for Edison's 'incredible' lack of foresight. Edison was a cultural product of the nineteenth century, the high age of literacy. Reading and writing skills had been disseminated on a mass scale; it was the age of novels, newspapers, letters. Everything was defined in terms of writing, including the reproduction of sound: 'phonograph' means 'sound writing'. The phonograph, along with its predecessors and rivals like the gramophone – 'sound letters' – shared the aim of printing: 'to transform sound into writing' (Attali 91). So dominant was the concept of mechanical writing that the inventors could not conceive of their sound recording devices except in terms of inscription; Edison could only conceptualise his invention as an aid to writing, a new form of writing.

31 This remarkable incidence is also a rejoinder to the argument – articulated from a cultural materialist position by Williams – that social need shapes technological invention. The phonograph did not initially answer a pressing social need: there was no pressing societal demand for the reproduction of audio and music. Indeed, the enormous cultural ramifications of sound recording technology were not apparent to its inventor: intention was not a factor in the inception of this technology. Enormous cultural effects emerged as a consequence of the unique intrinsic properties – the recording, reproduction and transmission of music – of the technology itself. This pattern has been similar in the case of many other inventions, including the internet: the intended applications of the technology are quickly usurped by unintended uses, as voiced in the cyberpunk

maxim, 'the street finds its own use for things.' The medium theory model would add the observation that those uses flow from the character and potential of the technology itself.

Actor-Network Theory and Other Alternatives

32 Various alternative theoretical models have emerged – within technology studies, sociology and related disciplines – to both medium theory and the opposing theory described above as the social shaping approach. This has occurred in part because at its most extreme, the emphasis on social factors becomes as reductive as McLuhanite technological determinism. As Bruno Latour observes, a polemical 'social determinism' arguing, for example, that the steam engine was the 'mere reflection' of 'English capitalism', is no less extreme and one-sided a view as the technological determinism it seeks to contest (2005: 84).

33 Theorists of technological change have attempted to devise models incorporating social forces and technological objects into a matrix of inter-dependence. Stephen Hill, for instance, has proposed the theoretical model of the 'cultural text', in which technological change is mapped according to 'the particular alignment' between the potential of new technologies and various political and social factors (1989: 33). Similarly, Mark Warschauer (2003) has proposed a 'social informatics' in which technology is considered in a context including infrastructure and the people working within that system.

34 A more thoroughly elaborated theoretical model is Actor-Network Theory (ANT), developed by Bruno Latour, Michael Callon and John Law in the 1980s. This model has attracted attention outside its immediate context in sociology because of its bestowal of agency on non-human actors within a network or system. Theorists of digital technology and networks have had recourse to ANT as a theoretical model. For example, Gerard Goggin in his recent book on cell phone culture approves of ANT's reworking of the 'formulaic oppositions between technology and society', which resists both the lure of technological determinism and the 'countervailing reaction that society determines technology.' ANT proposes instead a shifting interaction where technology exists 'in networks of things, actors, actants, institutions, investments, and relationships'; Goggin finds this model useful in charting the cultural uses of mobile phones (2006: 11).

35 However, ANT has had many detractors since the 1980s on a number of grounds, including objections to its 'symmetry' in the treatment of human and non-human actors (MacKenzie and Wajcman provide a summary of this controversy at 1999: 24, while Latour responded to many of the criticisms in an extended essay available at https://www.nettime.org/Lists-Archives/nettime-l-9801/msg00019.html). ANT has also been the subject of misapplication and misunderstanding, as Latour readily acknowledges: such misunderstanding was the prime motivation for Latour's book-length clarification and defence of ANT, Reassembling the Social (2005). Latour makes the helpful point in this book that the development of ANT was inspired by a need to refigure the 'social' in a context where 'science and technology have massively multiplied the participants to be cooked in the melting pot' (260). That is, conventional sociological theory was thought to be inadequate in the 1980s, in its ability to model aggregations and networks that incorporated new forms of technology. ANT is at the basic level a model for associations and assemblages.

36 One of several 'sources of uncertainty' associated with ANT, in Latour's view, was the theory's assertion that 'objects too have agency' (63): technologies are considered 'actors' within particular networks, along with human agents. ANT is not afraid to assess 'the many entanglements of humans and non-humans' (84), yet these encounters occur within a modeling that explicitly 'keeps the social flat' (165). There is a flattening out of all actors – human and technological – within ANT, which is committed to focusing on the network rather than individual agents. The association is the thing; all individual elements, whether particular machines or human operatives, are devalued within this model. Within this flattening out of agents, the intrinsic properties of individual technologies are lost, or at least de-emphasised. This leveling of the technological and the social means that ANT is of little use in evaluating the specificity of each technology, including media technologies. The unique properties of each device – what the technology brings to a system or an interaction with human agents – are effectively erased. This certainly avoids a technological determinist perspective, yet it also leaves technologies stripped of their unique qualities.

37 Ultimately, ANT shares characteristics of other theoretical models that emerged in the 1970s and 1980s, including Foucault's theory of power and various post-structuralist theories of association

and assemblage. These characteristics include a post-human concentration on the network, flow or system. Leo Marx has argued that such models bear 'strikingly close affinities' to the 'functioning of large technological systems'. Power is decentralized, flowing endlessly through society like 'information through a communications network' (1994: 24). Each model relegates or erases human agency within the greater network. While ANT cannot be conflated with the various forms of post-structuralism, its model reduces the role of technologies to the status of human actors.

Medium Theory in the Age of Digital Reproduction

38 We are now in position to re-consider the model of medium theory in the context of digital media and networking. On the level of popular discourse, it would seem that medium theory is everywhere, espoused daily. Every time it is claimed that digital media have altered knowledge, communication or social interaction – for the better or for the worse – some form of medium theory, including a degree of technological determinism – is (usually unwittingly) invoked. Examples of this invocation include the assertions that: sampling and downloading have re-shaped the making and consumption of music, that Powerpoint has 'dumbed down' presentations and lectures, that the Web has created new forms of knowledge and entertainment, that digital networking has forged new orders of community, that the mobile phone has changed social interaction.

39 Such sentiments are not reserved for everyday discourse or the popular press; scholarly and critical studies of digital culture share the orientation. Some commentaries take the form of enthusiastic declarations – of the Wired variety – that digital technologies have changed the world 'forever' and undoubtedly for the better. This boosterism is countered by cultural analyses adopting a tone of lament for lost social values in the wake of rampaging digital media. The tone of each article, essay or book is usually immediately evident from its title or subtitle. On the enthusiasts' side: How Weblogs Are Changing Our Culture (Rodzvilla 2002); 'How Technology Will Rewire the Music Business' (Kusek & Leonhard, The Future of Music 2005). On the side of lament (or outrage): 'How Google is Making Us Stupid' (Haigh 2006), The Cult of the Amateur (Keen 2006). There are many more examples of both schools that could be cited.

40 The elaboration of argument in works of either persuasion often contains a clear expression of medium theory principles, even if the model itself is not named. As an example, here is Rebecca Blood on blogs: 'Everything about them – their format, their reliance on links, their immediacy, their connections to each other – is derived from the medium in which they are born. They are of the Web itself' (2002: xi). Studies of digital music technologies are especially rife with medium theory and technological determinsim. Digital technology is often afforded agency in the construction of sentences: it is said to 'bring' change or 'enable' new forms of practice. Here is an example from Kusek and Leonhard's The Future of Music, a book celebrating the new digital era: 'Technology has brought powerful and disruptive changes to the ruling incumbents' (x). This claim is then given more detail: 'The combination of the CD format, personal computers, and the Internet was a true convergence of technologies that, in combination, started to tear the very heart out of the control that the music industry had over its product' (4-5). P2P file sharing, 'enabled' by free downloads of software applications (6) is now 'unstoppable' (146). There are 'Megatrend' cultural effects of these technologies, constituting 'changing paradigms of work and leisure' (165). More soberly, Henry Jenkins writes that digital convergent culture in general is 'enabling new forms of participation and collaboration' (245).

41 The deployment of medium theory's tenets is no less evident in those writers critical of the cultural effects of digital media. Keene's The Cult of the Amateur is a polemic 'about the destructive impact of the digital revolution on our culture, economy and values' (1). Keen declares that blogs are 'collectively corrupting and confusing popular opinion about everything from politics, to commerce, to arts and culture' (3). The overall effect of computer-based networking is for Keen 'mob rule', intellectual mediocrity and chaos. Perhaps because he – like other commentators of this ilk – adopts an anti-new technology perspective, Keen has recourse to a social shaping argument: 'the question is ideological rather than technological – and the answer is largely up to us' (189). His crusade is political, or rather moral: 'our real moral responsibility is to protect mainstream media against the cult of the amateur' (204). Yet his book is a condemnation of the socio-cultural effects flowing directly from the properties and potentials of Web 2.0. Haigh's critique of Google follows a similar trajectory: he attacks the indiscriminate nature of searches,

their quantitative rather than qualitative aspect, as a characteristic of the software itself, with deleterious intellectual effects.

42 I do not wish to endorse either of these perspectives – boosterism or elitist social critique – as a contemporary exemplar of medium theory. Both exhibit a simplistic account of contemporary culture, albeit from diametrically opposed perspectives. My intention has been merely to indicate the pervasiveness of medium theory – or at least crude versions of the model – in many of the descriptions and analyses of contemporary digital media technology. A more sophisticated form of analysis must consider both the social forces and agencies responsible for the development and implementation of new technologies, and the properties and potentials inherent in the technologies themselves. My basic contention in this essay has been that many analysts, especially from the critical theory perspective, have been reluctant to embrace the 'intractable properties in the things themselves', in the words of Langdon Winner (27) – who has not been afraid to engage with the qualities of machines. Technologies, he has argued, often carry 'inherently political' properties – whether they have been designed with that intention, or whether aspects of their design generate totally unforeseen cultural and social effects. Critical theorists of technology, who have expressed an understandable aversion to the political tenor of technological determinism, nevertheless diminish the analytical power of their studies if they fail to take into account the properties intrinsic to digital technologies.

43 The other advantage of medium theory as a model is its orientation to medium specificity. Each technology or media form will have unique properties, which in turn will produce the potential for differing cultural effects. It should be uncontroversial to claim that the properties of Net technology require active users; the Net rewards curiosity; it encourages communal interaction. However, we should also remember the prevalence of text as a form of expression on the Net,. This underlying dependence on literacy was always the qualifying factor in the 'secondary orality' of electronic mass media culture, as acknowledged by Ong; it is more pertinent than ever in considering digital culture. Email, to take the most obvious example, is a neo-literate form; it partakes of the emotional coldness of text. A degree of literary skill and effort is required to express, in electronic text, the emotional warmth easily conveyed by tone of voice on phone or radio, or by a smile on video or TV. The use of netiquette symbols – 'emoticons' – is an attempt to infuse the new medium with a supplement of emotional character. But beneath the hype of email romance, email antagonisms – induced by misinterpreted or unsatisfying email correspondence – is a less remarked-upon product of the digital network.

44 In a world of networking and interactivity, finally, the typology of specific media with their specific effects begins to break down. The old mass media form – TV – is melding with the participatory digital medium – the Net-linked personal computer – to form a new hybrid technology; the mobile phone takes this hybridity a step further. The fusion of the primarily passive mass media form (a 'cool' medium in McLuhan's terms) with the active digital one, creates new types of engagement. Convergent digital media is a liquid form, and will become increasingly liquid in the future. The hierarchy within the sensorium – as assessed by several medium theorists in different contexts – is in flux. Tactility has re-emerged as a key sense experience, most notably in texting. Pierre Levy has proposed that digital media will break down 'the facile opposition between the reasonable text and the fascinating image' (1994: 14); we can add to that the seductive sound, and the engaging touch. The technology becomes more complex, more inclusive; the message will have all the more potential. In our attempts to theorise these developments within media technology and usage, an attention to the intrinsic characteristics of specific technologies will be needed. This does not call for a reductionist form of medium theory, as has been propounded in the past; rather, it calls for a theoretical model sensitive both to the social context of new media technologies and to the properties of those technologies themselves.

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