CHAPTER 2

The Socio-technical Interface

As we have seen, the conceptual evolution of digital media and social change interacts with a rich and complex historical tapestry that blends the fantastic and the bureaucratic, the philosophical and the technical, the idealistic and the instrumental. In order to make sense of the multifaceted nature of the socio-technical interface that lies at the heart of digital society, we must carefully consider the intrinsic relationship between the technical apparatus and the wider social structures produced by collective human actions. To put that more simply, we need to understand how computer systems relate to human systems and vice versa. Putting things simply does not, of course, imply that easy explanations are close at hand. The nature of this particular socio-technical interface is highly complex and, as a result, the vast amount of information available to us provides support for very different forms of argument about human–machine relationships. We should not be surprised by this. The competing claims of natural science and human ingenuity represent a central challenge for any serious attempt to understand a technologically advanced society. Nonetheless, the broad parameters of the debate are within our reach, and we should make a modest start by recognizing the most influential contemporary accounts of the effective relationship between technology and society. We can then, in each and every encounter with the digital, consider the relevance of those arguments to a critical understanding of contemporary society and the 'rise of the machines'.

Technological Determinism

The very term 'digital society' is far from neutral, since it implies that it makes sense for us to begin with the technology. Starting with the first word appears to be self-evident 'common sense' (that is, until we stop to consider the arbitrary logics that structure the order of words and the naming of things). Of itself, digital technology has no innate preference for reading left to right (or top to bottom). Similarly, our starting point in this debate appears natural enough, but it is in fact arbitrary. That is, we will start with the technology because we must start somewhere, not because it makes any more or less sense than starting with the human dimension. You might wonder why I am trying so hard to muddy the water at this early stage. There are two vitally important reasons for me to emphasize the significance of our starting point in this chapter. One reason is that the conventions of the written word tend to imply that the final argument considered is the right one, and that will not necessarily be the case here. The other reason is that in order to make sense of this discussion, I need to try and step outside one of the most widely accepted ideas in modern history: the inevitability of scientific progress. In order to make this work effectively, you will have to grant me a measure of creative licence. First of all, you must pretend not to notice that my communication with you is

McLuhan's popular touch was something which drew admiration from the younger generation of his day, but it also brought reproach from other scholars in the field who found his work variously apolitical, rhetorical, faddish and simplistic. McLuhan's work was at the height of its influence during the late 1960s, was generally discredited during the mid-1970s and then underwent a major revival with the coming of the Internet in the 1990s. This particular medium seemed to fit his theories of the media even better than the prevalent media of his own times. Accordingly, McLuhan's account of the media has enjoyed a major revival in the era of digital media, and he has become revered by the technologically minded as a 'prophet' of the electronic age (Levinson 1999).

Medium as Message

McLuhan believed that the major social effect of all media was the extension of our physical senses by technological means. Print media, for example, extended our capacity of speech. Photography and cinema extended our capacity of vision. Radio and the phonograph extended our capacity of hearing. In providing humanity with these sensory extensions, the media apparatus radically transforms both the scale of human society and our perceptions of that society. Simultaneously, it transforms our perceptions of ourselves and of each other. According to McLuhan's logic, any technology that extends the human senses can be considered a medium. As an extension of humanity, a media technology functions as a conduit for human activity. A media, in McLuhan's sense of the term, inevitably transforms (mediates) the way that sensory actions are performed in society. As such, the real significance of a communications technology is not found in the content that the technology is used to transmit, but rather in the new ways of speaking, reading and thinking that are made possible by the feat of transmission itself. This, according to McLuhan, is the true message of a medium, as expressed by its capacity to transform human affairs.

> In a culture like ours, long accustomed to splitting and dividing all things as a means of control, it is sometimes a bit of a shock to be reminded that, in operational and practical fact, the medium is the message. This is merely to say that the personal and social consequences of any medium – that is, of any extension of ourselves – result from the scale that is introduced into our affairs by each extension of ourselves.
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> Our conventional response to all media, namely that it is how they are used that counts, is the numb stance of the technological idiot. For the 'content', is like the juicy piece of meat carried by the burglar to distract the watchdog of the mind. The effect of the medium is made strong and intense just because it is given another medium as 'content'. The content of a movie is a novel or a play or an opera. The effect of the movie form is not related to its program content. The 'content' of writing is speech, but the reader is almost entirely unaware either of print or of speech.
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> Marshall McLuhan (1964), *Understanding Media: The Extensions of Man*, New York: McGraw Hill, pp. 7–8

> Whether the light is being used for brain surgery or night baseball is a matter of indifference. It could be argued that these activities are in some way the 'content' of the electric light, since they could not exist without the electric light. This fact merely underlines the point that the media are the

> information is provided. Telephone is a cool medium, or one of low definition, because so little is given and so much has to be filled in by the listener. On the other hand, hot media do not leave so much to be filled in or completed by the audience. Hot media are, therefore, low in participation, and cool media are high in participation or completion by the audience. Naturally, therefore, a hot medium like radio has very different effects on the user from a cool medium like the telephone.
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> Marshall McLuhan (1964), *Understanding Media: The Extensions of Man*, New York: McGraw Hill, pp. 22–3

For McLuhan, media like radio, cinema and print can be considered 'hot' because their appreciation requires intense concentration by the audience. The audience is never left to 'fill in the blanks' or allowed to participate in their function. These are media technologies that require specialists to operate them and, in turn, favour a specialized understanding. By contrast, 'cool' media like telephones and television are not seen to require intense concentration by the audience. The audience is free to take breaks, to 'fill in the blanks' and to participate actively in their narrative function. Cool media do not require a specialized understanding to operate; nor do they require a high degree of media literacy to enjoy. McLuhan also drew parallel distinctions between hot and cool forms of behaviour, personalities and cultures. McLuhan believed that the social effect of the media was often determined by the interplay of hot and cool factors that surrounded its use in society. He believed that a hot medium might 'strike terror' in a cool society, whilst a cool medium would likely appear banal to members of a 'hot culture'. McLuhan suggested that a hot medium in a hot culture produced a 'hypnotic effect', whilst a cool medium in a cool society produced a 'state of hallucination'. He subsequently claimed that social order could be maintained by employing media technologies to balance hot and cold sensory effects (2001: 28).

In order to make sense of these statements, we need to recognize that throughout all his works, McLuhan remained committed to a single historical framework by which the Western world was seen to have progressed from a cool oral culture through a hot print society into a rapidly cooling electronic age. That is, McLuhan considered that the social imagination was essentially shaped by spoken communication before the advent of print technology. With the spread of the printed word, however, human beings developed a new relationship to knowledge and to each other. This was the birth of a 'hot' Western society – composed of rational, logical and detached individuals. According to McLuhan, other parts of the world mostly remained within an earlier 'cool' stage of development, where spoken forms of communication shaped a more collective, intuitive and emotive mentality. At the time he was writing, McLuhan believed that the new electronic media were essentially interactive and intuitive 'cool' systems that would encourage greater participation and interchange amongst their users. As such, he believed the new media would shift the Western world back into a 'cool' state.

The Global Village: Interconnectivity, Utopia and Conflict

In 1962, McLuhan coined the phrase 'the global village' in his book *The Gutenburg Galaxy*. He used this phrase to refer to the advanced stage of connectivity that the world had reached through modern technologies. He returned to this theme in *War and Peace in the Global Village* in 1968, where he elaborated (again in a graphically illustrated exposi-

McLuhan's Wake

After Marshall McLuhan died in 1980, many of his ideas were seen as belonging to the 1960s. Within two decades, however, the advent of the commercial Internet and the intellectualization of consumer electronics brought many of his ideas back into prominence. McLuhan's central tenet was that: if we wish to understand the social significance of the media, we must critically examine the cognitive effect of that technology upon human subjectivity. This remains the core of McLuhan's influence upon the sociology of media. It was in accordance with this emphasis upon the decisive role of technology in shaping social change that the technophile *Wired* magazine named McLuhan as its 'patron saint' during the 1990s. At the same time, within the equally wired academic domain, McLuhan's theories of media were being given a new lease of life as they were applied to the burgeoning realm of digital media applications, and to personal computing in particular (for example, Biro 1999; Bolter and Grusin 1999; Dery 1996; Horrocks 2000; Johnson 1997, 2001).

As a clear statement of technological determinism, McLuhan's arguments have been particularly amenable to scholars engaged in making projections on how the everyday presence of digital media will further transform modern society (Kroker and Kroker 1997; Landow 1997; Levinson 1999). McLuhan's distinctive psycho-social conceptualization of the sensory overload arising from the electronic extension of man was also forcefully taken up by 'postmodern' social theorists at the end of the twentieth century. His influence is notable in the work of Jean Baudrillard, and also contributes to the explanations of the digital media age put forward by Nicholas Negroponte, Mark Poster and Paul Virilio (Negroponte 1995; Poster 1995; Virilio 2000). Jean Baudrillard, the influential French theorist, was also attentive to McLuhan's claim that the mediating power of technology overwrites our sensory system to such an extent that rational, objective accounts of mediation are wholly ineffective, and arguably missing the point when it comes to the 'message' of the digital apparatus (1988).

In the present 'multimedia' era brought about by digitization, it has become apparent that McLuhan's earlier distinctions between the interactive 'temperature' of media forms have become hopelessly blurred. The 'hot media' of cinema, radio and the printed world are rapidly becoming forms of content within the interface of the personal computer, rather than being mediums in their own right. As such, McLuhan's observation that each media technology adapts the forms of previous media technologies for its content appears to have been validated. At the same time, McLuhan's attention to the distinctive nature of various mediums and his proposition of using a media mix to balance sensorial effects have clearly become obsolete. We can see, therefore, that the dominant idea of 'media' has moved since McLuhan's time from a plural reading of the term to something more akin to a monolithic apparatus of social communication. In contemporary society, the mass media operate as an aggregation and combination of technologies and social institutions. Therefore, in order to follow McLuhan's lead, we must approach them as a suite of interrelated technological effects: that is, as media.

The Social Shaping of Technology

Another of McLuhan's favourite sayings was that 'we shape our tools and our tools shape us'. It must be said, however, that he paid scant attention to the first component

process, Williams responded critically to the popular accounts of media influence being offered by Marshall McLuhan. At one level, Williams put McLuhan's observation that 'the medium is the message' into practice by outlining the particular nature of television and ways in which that technology favoured certain structures of content (which Williams termed 'flow' and 'sequence'). At another level, Williams attacked McLuhan for his scientific mysticism and his alleged overstatement of 'technological determinism'.

Against Technological Determinism

The essence of Williams's critique of McLuhan's theory of media was grounded in a rejection of the idea that human society was shaped by the impact of technological advance, at least in ways that attributed technology with an internal logic that superseded the importance of human inputs. Williams noted that technological determinism of this kind had come to operate in the modern world as 'an immensely powerful and now largely orthodox view of the nature of social change' (Williams 1974: 130). This view implied that technologies emerge from 'an essentially internal process of research and development' and subsequently determine 'the conditions for social change and progress' (ibid). With scientific advance in the driving seat, the nature of human progress becomes overwhelmingly defined by 'the history of these inventions', which are therefore seen to have 'created the modern world' (ibid). As a result, we become inclined to see social change as being dictated by the workings of technology rather than by human agency. Simultaneously, we are isolating the processes of scientific development from the rest of society, attributing them with their own unquestionable technical laws and insulating the 'inevitable' march of technological progress from moral or political questioning

> The work of McLuhan was a particular culmination of an aesthetic theory that became, negatively, a social theory: a development and elaboration of formalism that can be seen in many fields . . . but which acquired its most significant popular influence in an isolating theory of 'the media'. It is an apparently sophisticated technological determinism which has the significant effect of indicating a social and cultural determinism, that is to say, which ratifies the society and culture we now have . . . For if the medium – whether print or television – is the cause, all other causes, all that men ordinarily see as history are at once reduced to effects. Similarly, what are elsewhere seen as effects, and as such subject to social, cultural, psychological and moral questioning, are excluded as irrelevant by comparison with the direct physiological and therefore 'psychic' effects of the media as such.
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> Raymond Williams (1974), *Television Technology and Cultural Form*, Baltimore, MD: Penguin, p. 131

In order that our sociological understanding of mass communications should not be reduced to a mere recording of the 'impact' of particular technological forms, Williams argued that we should continually bear in mind the development trajectory of those technologies. In doing so, it is necessary that we take note of the various actors who took part in their development and identify the intellectual objectives of the designers and patrons of the research process. Thus, in order to avoid what Williams saw as the trap of technological determinism, we have to understand where each technology comes from. In this respect, there are important confluences and divergences between scientific and sociological understandings of technology.

which are, in the broadest sense, imaginable under those social conditions. Cinema, for example, can be seen as a technical practice that responded to new metropolitan social worlds and became viable as a commercial medium due to the rise of mass societies. Television, with its domestic location, can be seen as a communications technology that responded to the extension of Fordism and consumerism, and to the increasing mobility (and isolation) within society as exemplified by the nuclear family unit in the 1950s and 1960s. Because human societies are all characterized by particular structures of power in which some people rule over others, Williams was also keen to point out that the pattern of technological development is determined not simply by scientific facts or common social needs, but to a significant extent by the privileged interests within society. As he puts it: 'A need which corresponds with the priorities of the real decision-making groups will, obviously, more quickly attract the investment of resources and the official permission, approval or encouragement on which a working technology, as distinct from available technical devices, depends' (1974: 19).

Furthermore, since the world is presently configured within a system where different societies compete with each other for resources, 'We can see this clearly in the major developments of industrial production, and, significantly, in military technology' (ibid). Williams noted that all of the major developments in mass communication had arisen in the service of military and commercial operations, and that technologies lacking such potentials are frequently left to languish. Prior to the advent of a sophisticated consumer market, it was only as a by-product of these original usages that communications technologies became available to ordinary people (Standage 1998). We can also find this pattern replicated in the implementation of digital technologies, which were overtly military in their inspiration and were subsequently adapted to the needs of large commercial corporations, scientific institutions and government bureaucracies, well before they became available as a domestic medium for entertainment.

Box 2.1 Social shaping of digital media

Digital media technologies can be seen as being socially shaped prior to use:

- Because technological research is an accountable goal-oriented practice directed by powerful interests with their own distinct objectives
- Because advances in communications technologies are a necessary means of adapting to cumulative forces of social change
- Because mass communication is an area of social practice where control over usage is exercised by certain interests, social conventions and legal mechanisms
- Because the popularization of a technology in commercial societies implies design imperatives motivated by profit

Uses and Appropriations

As we can see, the primary purpose of the SST thesis is to break down the perceived separation of the scientific and social domains, laying claim to science and technology as a subject for sociological inquiry (Bloor 1991). In itself, this does not necessarily negate McLuhan's identification of the psycho-social effects of media technologies, but what it does do is insert a critical feedback loop into the socio-technical interface. This brings us more closely in alignment with the idea that 'we shape our tools and our tools shape us'.

constituted historically, as in Raymond Williams's work, or it could be conducted solely against the backdrop of present social conditions. An SST approach to digital media may choose to emphasize the guiding hand of dominant social institutions (such as government or market forces) in the development process, (acting either in concert or in contest). Alternatively, an SST approach may focus upon the post-development, or 'implementation', phase of an application. In doing so, you might choose to emphasize the shaping power of decision-makers or of the general public, or to seek to identify the meeting of the two.

In the social sciences, the SST thesis has been applied to the digital media under the heading of 'social informatics', which investigates the layers of negotiation between social actors as a framing process for technical development (Kling 1996). While there is a marked bias in social informatics towards understanding the development phase, a greater emphasis on the implementation phase can be found in studies emanating from humanities disciplines such as sociology and cultural studies (Bell 2006; Lievrouw and Livingstone 2005). Corporations that invest in commercial technical development and government agencies tasked with promoting the use of technology (such as the UK government's 'Race Online 2012' campaign) have typically adopted a 'Diffusion of Innovations' approach. This is broadly an applied science model that seeks to encourage the adoption of new technologies and to finesse applications to increase their uptake in society. Diffusion of Innovations approaches tend to be more technologically determined, although they may still seek to introduce a feedback loop into the design process (Rogers 2003). A further distinctive set of approaches has also emerged under the heading of 'Actor-Network Theory', which seeks to reconcile the competing claims made by technological determinism and SST models (Law and Hassard 1999).

All of these available approaches to understanding both the extent and the quality of the interface between technology and society are structured to some extent by the two very different viewpoints explored in this chapter through the work of Marshall McLuhan and Raymond Williams. In any sociology of mass communication, this debate becomes particularly pressing because the technology in question is not only a medium for human action, but also the primary arena of interaction, where ideas and meanings about society are produced and given expression. In the present era, the critical questions that arose with the early electronic media have been reframed by the rapid convergence of media forms and the incredibly varied applications of digital technology. As a consequence, this set of debates around the nature of the socio-technical interface will have a bearing upon all of the theories, models and topics that you will subsequently encounter in the rest of this book. Needless to say, it is crucially important that you are able to identify the competing influences of these viewpoints, and to formulate your own ideas about where you stand on this issue.

Think and Discuss

1. Key Terms

Can you describe in simple language what is meant by the following terms found in this chapter?

- Socio-technical interface
- Technological determinism
- The medium is the message