



Culture, Communication and Change:

**Reflections on the use and impact of
modern media and technology in our lives**

Editors: Anna Mieczakowski, Tanya Goldhaber
and John Clarkson



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Foreword

**Anna Mieczakowski,
Tanya Goldhaber and
John Clarkson**
Engineering Design Centre,
University of Cambridge

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**This book presents
the views of twelve
experts from a wide
range of disciplines
on the debate on
the individual and
societal effects of
modern ICT.**
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As we enter the second decade of the 21st century, the pace of technological innovation continues to increase, pushing human capability to heights previously imagined only in science fiction. One of the areas changing most rapidly is that of communication. A spate of new devices and services make it possible to stay connected anywhere, all the time, and the flow of information is nearly limitless.

With all the benefits afforded by these newfound capabilities, however, come potential consequences. Following the ever increasing flow of information through our computers, televisions, and phones has been a stream of concerns about the change in how we, as humans, communicate. Will the new ways in which we acquire, process, and relate to information in turn change us as individuals, families, and societies?

Many of the predictions of the use and impact of modern technology, both positive and negative, are rather speculative and tend to be extreme. Others, in the minority, are based on

years of rigorous research. However, the issue is incredibly complex and interdisciplinary, so it is fair to say that no one researcher has the whole picture. Moreover, there is an incredible diversity of opinions even within the same discipline.

The University of Cambridge's Engineering Design Centre was commissioned by BT in 2010 to conduct a research project with the objective of starting to build a comprehensive understanding of the role and impact of modern technology in modern life. Importantly, this study has drawn on a variety of information sources, including unique data, in order to create a more complete picture of the impact of Information and Communication Technology (ICT).

The project, international in its scope, was run in the United Kingdom, United States, Australia and China. The outputs of the study were both descriptions of how communications technologies are currently used in different cultures and countries and ideas for what the best balance of

Our experts' disciplines include: neuroscience, psychology, human-computer interaction, computer science, behavioural economics and well-being.

communication methods, both face-to-face and electronic, might be for people and their families in the future.

Because of the interdisciplinary nature of the study, the project was run in four phases, each of which provided different insights. First, an international literature review determined much of what has already been discovered on the subject. Second, experts from different fields were consulted to capture their opinions and insights about the state of communications and people's behaviour in today's world. Thirdly, an in-depth investigation with a number of families was undertaken to discover what methods of communications they use on a daily basis, why, and how it affects them as individuals and as a family unit. Finally, a survey was conducted in each participating country to understand the tendencies and opinions of the broader populace.

This book presents the second element of this research project: the views of experts from a wide range of disciplines – including

neuroscience, psychology, human-computer interaction, computer science, behavioural economics and well-being – on the debate on the individual and societal effects of modern ICT. Experts were selected to provide the broadest possible range of perspectives on this issue, each being able to share uniquely informed views and insights. These experts are renowned in their respective fields, and their opinions are formed not only from their own research, but also from the research and contributions of others in their disciplines.

The views of the twelve experts were elicited through conversations conducted by the editors of this book, who then condensed the main points into the following thought pieces. Each piece was edited and approved by the expert and accurately reflects their views and research, and where relevant, the research of others.

The pieces included in this book are listed opposite. We hope that this unique collection of twelve thought pieces will give a broader perspective on the impact that communications technologies have on individuals, families and society as a whole.

“As communications technology becomes increasingly central to every person's life, it will inevitably change the dynamics of society in some way. Debate around the exact nature and impact of these changes has been taking place in bars, homes and newspapers across the world.

It is right that BT should take a lead, and is working with the University of Cambridge, to help inform the ongoing debate. BT is a communications business. The evolution of communications technology and how it impacts families is linked to the core of what we do.

This book, which is a key part of that University's research, brings together 12 great minds in this area from across the world. I believe it is a valuable addition to the debate, attempting to address many of those unanswered questions about how communications technology usage is affecting society. I hope you find it an interesting read”

Gavin Patterson
CEO BT Retail



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Chapter 1:

Distractibility, self control, and technology

Dan Ariely
Duke University

Professor Dan Ariely studies irrational behaviour and how it influences our everyday lives. We spoke to him about the role that technology plays in our lives and how that affects or is affected by irrationality.

Ariely feels strongly that technology is a wonderful distractor, largely because it caters to the natural distractibility of human nature. He explains that such activities as checking email can become addictive because of the ways in which people respond to uncertainty in receiving rewards.

When rats are put in a cage and taught that they must push a lever a certain number of times to receive a food pellet, they press the lever when they are hungry and spend the rest of the time engaging in other activities. However, if they are taught that they must push the lever an

arbitrary number of times to receive food, in other words that one time the food comes after three presses and another time after fifty, the rats begin to spend all of their time pushing the lever in anticipation of the eventual food reward. Ariely argues that email activates a similar response in the human brain. An email containing good news or news from an old friend is a "reward", but usually one must check email many times – the equivalent of pressing the lever – in order to receive such a reward. With reinforcement, checking email becomes compulsive.

One problem with this, Ariely explains, is that the frequency of distraction is inversely correlated with productivity. The more people stop what they are doing to check email, whether this is because they actively switch tasks to check or because they are alerted by their computer that there is a new email, the less productive they become. People, however, tend to be bad judges of their ability to multitask and task switch effectively. Evidence from researchers at Stanford University shows that people who

multitask frequently are actually worse at filtering distractions and remembering information. These multitaskers, however, would insist that they are actually more productive and accomplish more than they would if they stayed with one task until completion. The lesson? The average person is generally unaware of the cognitive effect that technology is having on their life.

This raises the point of self-control. If people do want to be more productive and lessen the potential negative impacts of technology, they will need to make a conscious effort to control how they use it. In response to the supposition that some people naturally have more self-control than others (see Rebecca Saxe's thought piece), Ariely counters that there is no perfect instance of self-control; people are always better at controlling themselves in some situations and not others. A person who can spend hours in the library studying even when his or her friends are out socialising still may not be able to resist that last slice of cheesecake. Of course, those people who are most susceptible to technological distraction must become aware of it before they can even start to learn to control their behaviour.

In addition, the self-control question is more complicated than it appears. What looks like exquisite self-control can actually just be an instance of rule-following. Self-control has to do with being cognisant of the potential long-term consequences of an action and acting accordingly, even when the short-term consequences would be pleasurable. Rule-following, in contrast, only requires that one

does what one is told. For example, someone who is told that they must check their email only twice a day and then does so is not exhibiting traditional self-control, but rather is following a rule. While self-control will likely play a big role in how much modern technology affects any one individual, it is important to keep in mind how self-control is characterised and how it differs between individuals.

There is another reason that things like email are so addictive, and this has to do with the human sense of accomplishment. Every time a person completes a task, they get a positive feeling associated with accomplishing something. Since replying to emails is relatively easy, and already quite addictive, people have a tendency to reply to emails instead of completing larger, often more pressing tasks. In addition, since any downtime during the day can easily be filled with replying to emails (or similar tasks), people do not allow themselves enough mental downtime (see Felicia Huppert's thought piece). Unhelpfully, most workplaces have developed the assumption that employees will be on email all the time, developing both a false sense of urgency and an unhealthy dependence on email communication to solve problems. While email does facilitate communication, it can lead people to neglect potentially more important tasks.

We also queried Ariely about how technology, in particular Computer Mediated Communication (CMC), affects people's social perception. One of the big problems in current CMC, says Ariely, is the lure of ambiguity afforded by both the

filtering out of social cues that happens with CMC and the ability people have to screen certain aspects of their behaviour or personality online. When people are forming a mental picture of someone in a CMC setting, they falsely attribute positive characteristics in the absence of social information. The brain can fill in lost cues with desired information, allowing people to imagine someone as a more ideal person.

Ariely, however, agrees that things might improve over time. CMC technology is increasingly trying to reincorporate social cues into the communication equation, whether that be through emoticons, video feedback, or some other method. New ways of communicating with technology are being developed all the time, and as people learn to use those technologies effectively, it is certainly possible that the impressions we form of people via CMC will more closely match their real-world personas.

However, bringing people back to a more healthy relationship with technology is not a lost cause. Ariely asserts that because people are so unaware of their behaviour and the effects it has, they do not have the incentive to change. If people were provided with tools to both track and suggest improvements to their behaviour, and then observed positive results from these changes, it might be possible to eventually create a much more healthy human-technology interaction.

The average person is generally unaware of the cognitive effect that technology is having on their life.

Chapter 2:

Historical perspectives and the adaptable brain

Alan Blackwell
University of Cambridge

Alan Blackwell is a Reader at the University of Cambridge Computer Laboratory. He is an expert in Human-Computer Interaction (HCI).

When asked whether people should worry about modern technologies changing their brains, Blackwell responded that the brain is always adapting and restructuring itself in response to environmental stimuli. Any recent adaptations should be

considered business as usual rather than a cause for concern. On evolutionary timescales, the past few decades will not have resulted in any changes more frightening than the previous adaptation of language centres in the brain to the written word.

Blackwell believes that it is society, rather than the human brain, that is being changed by pervasive use of Information and Communication Technology (ICT). The structure of Western society has been defined by its information technologies for



centuries – libraries, governments, postal services and universities. Within the last half-century, those who lived in remote places could only engage in broader society to the degree allowed by constraints of their local library or postal service. The information that filtered through might be serendipitous, accidental, or subject to the whims of an eccentric bookshop owner. Now, in principle, the stores of common knowledge, and intelligent people to discuss it with, are accessible from anywhere.

Yet this frictionless flow of information may bring new drawbacks. The life of an academic (or any business or government “thought leader”) relies as much on reflection as on reading. Time spent flicking through a card catalogue, or waiting for an inter-library loan, was once useful time for thinking about problems more deeply. Instant navigation from one web page to another, like instant responses from Google or Wikipedia, encourages the impression that simply finding information is productive intellectual activity. Blackwell is concerned that when we focus so much on finding information, we have little time left for thinking about it.

In his research field of HCI, there has been sustained attention to different “affordances” of paper and screens, most recently around the introduction of e-book readers. It is clear that many personal habits and established strategies of reading are becoming disrupted – making notes in margins, flicking through chapters or folding over pages. The potential for richly improvised embodied strategies will not be supported by electronic readers, where every feature must

be designed and implemented by developers. However, Blackwell also notes that there is continued anxiety over changes of format and genre – are “attention spans” being damaged by the readership habits of Twitter and Short Message Service (SMS), leading to the death of the novel or of sustained argument?

In this respect, he sees less cause for concern. Anxiety about lack of discipline in the younger generation is a perennial feature of human life. Technical innovations are easily interpreted, from a conservative perspective, as symptoms of moral decline. Those conservatives, however, tend to be complacent about the historical origins of their own established habits.

The introduction of the printing press, newspapers, cheap writing paper, the Penny Post, and the telegraph have all raised popular concerns in the past that can be seen as directly comparable to current commentary on ICT.

Blackwell describes a well-preserved record of historical change in the correspondence of Charles Darwin, archived in the Cambridge University Library. Darwin’s early correspondence exhibited the elegant “copperplate” handwriting of the 19th century, with letters drafted and re-copied onto expensive rag paper before being sealed and hand-delivered. By the end of Darwin’s career, the combination of cheap wood-pulp paper and the multiple daily deliveries of the Penny Post had resulted in a casual writing style, rapid exchange of queries and replies among his colleagues around London, and a surprisingly

close resemblance to modern email correspondence. Darwin’s own research habits were transformed, and he undertook large-scale projects that relied on international networks of collaborators to an extent that would not have been possible in his earlier career.

Case studies such as this one make it clear that technological change, rather than representing lack of discipline or moral decline, provides opportunities for adaptation. Blackwell therefore recommends improved historical awareness in order to differentiate those technologies that have genuinely transformative potential from those that simply recapitulate familiar inter-generational dynamics. It is also important to be agile in identifying and recognising the new skills that will empower people to innovate with new technologies. In the 19th and 20th centuries, mechanical skills and interests were often disparaged as

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being more suitable for tradespeople than intellectual leaders. As a result, engineering innovation was more often achieved by Scots, Americans and Scandinavians than by the class-bound English. In the 21st century, computer programming skills seem to be presenting a similar cultural blind spot. They are being gradually removed from school curricula, unpopular at university, and disparaged as the domain of the “geek” rather than a routine and essential skill. Nevertheless, inability to write a script or macro must eventually become as ridiculous as inability to use a screwdriver. But significant change in attitudes is required for this to come about.

Blackwell wants to ensure that the progression of technology does not end up excluding any particular group of potential users. People traditionally disenfranchised by technological progression – the lower classes, ethnic minorities, etc – will find themselves even farther behind in a society that does not ensure all people have access to critical technology with the skills to use it effectively. For every parent who worries that their child spends too much time on Facebook, there is a child without regular access to a computer. Technology research currently takes place in an environment looking as though it might be a political vacuum, but in fact a highly homogenous and unquestioning continuation of 20th century libertarian thinking. The missing historical and political awareness is a dangerous blind spot for future innovation.

Blackwell would also like to see technology used more as an educational tool. For example,

he suggests that programming can be de-mystified by making a conscious effort to show a wider variety of its applications. People have recognised the importance of getting typically underrepresented groups, such as women, interested in science and technology. One way of doing this might be to show how programming is used on the stage, in fashion or the cosmetics industry, or other aspects of life that might be considered appealing to specific groups during their student years.

Inclusive design approaches to user interface will also remain imperative. Many designers operate under the mistaken notion that, as the “digital natives” grow up and become the majority, current issues with older users adapting to new technology will disappear. In reality, Blackwell says, older people will always find it difficult to adopt new innovations, so technology must be designed in collaboration with those users who will have the most difficulty. This is the only way to develop a user base across all age groups.

Finally, Blackwell challenges paternalistic approaches to “healthy” technology use. Even if people do not fundamentally change their personality and priorities, they are capable of making small changes that will improve their quality of life. Encouraging and facilitating small changes that make a big difference is the key to helping people use technology optimally.



Chapter 3:

Design, environment, and cognitive constancy

Chris Csikszentmihályi
Massachusetts Institute of
Technology

Chris Csikszentmihályi has a diverse background spanning both the humanities and technical disciplines. Equal parts artist and innovator, he finds ways to use technology to empower individuals and communities.

One problem with technology, explains Csikszentmihályi, is that it is ultimately developed by corporations who are trying to meet corporate needs. What is necessary to develop healthier uses for technologies is to understand what users need and design technology around those needs. Much technology can be adapted to serve the needs of both individual people and communities, but those groups must first be understood.

A common concern, particularly for the older generation, is that interaction with technology is changing human cognition. Csikszentmihályi argues that fundamental human cognition is not changing, but that the environment in which it is operating is. For example, disorders around attention deficit did not exist until the invention of the assembly line. The ability to do one task repetitively was not really important until industry required large numbers of people engaged in a monotonous activity for many hours each day, and those who could not function in such an environment were labelled as having a problem.

The problem, however, may not be the lack of the ability to focus on one task for a long period of time as a natural human capability, but rather that assembly lines do not really cater to human cognitive capabilities. As a technology, assembly lines are focused more around corporate needs than around employee needs.

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**Social alerts are hard to tune out...
 “You can ignore a dryer buzzer but you can’t ignore your mother”.**

Problems with technology use may well have to do with problems with the technological design, not with the users themselves.

In fact, concern with the pace of technological advancement and overstimulation due to technology is nothing new. The condition of Neurasthenia, coined originally in 1869, refers to the condition resulting from the exhaustion of the central nervous system, thought to occur due to modernisation. This condition bears a striking resemblance to modern concerns about the effects of technology usage, but Csikszentmihályi argues that concerns about such medical “conditions” are often simply a reflection of societal fear.

In response to the supposition that people are becoming more distractible due to technology, Csikszentmihályi posits that one reason that people might be more distracted by technology is that the alerts from devices are becoming increasingly social in nature. Devices now alert us to text messages, voicemails and even the locations of our friends, whereas previously devices might only send out alerts when they were out of batteries. These social alerts are hard to tune out. As Csikszentmihályi puts it: “You can ignore a dryer buzzer but you can’t ignore your mother”.

This social distraction is more prevalent because recently it seems that all mobile devices have become primarily communications devices, and furthermore multi-modal communications devices. The average phone can call, text, and email, not to mention Twitter and Facebook,

and recently things like video chat have been added to the mix. On the positive side, this can be used as scaffolding for social collaboration. What might seem distracting to an individual can be enabling for a community that needs a support base.

One global concern that Csikszentmihályi has is over the Zeitgeist¹ of technology, which is often treated as a process in itself, as if technology development is almost an evolutionary process, or autonomous. This attitude is often reflected in popular media such as Wired magazine and by technologists themselves. While the idea that technology is “evolving” is not new – in fact the phrase was coined by Samuel Butler shortly after Darwin - Csikszentmihályi says that the problem with this conceptualisation is that it lifts from the innovators the onus of responsible technological development. If it is the technology itself that were evolving then the control would be out of the hands of the developers, but in fact the control has always been and will always be in their hands, and to represent it otherwise is irresponsible. Developers have a responsibility to users to minimise technological risk.

What would be some ways that technology could be developed more in sync with the needs of people instead of the needs of developers? One example of a pervasive but misguided technology is the calendar application. The current calendar, whether electronic or on paper, is centred on the 9AM – 5PM time slot and leaves less room for evenings and weekends. However, this is when people will hypothetically be



spending time with their friends and family, time that is arguably as important as time spent at work if not more so. What if the calendar were reworked to place greater emphasis on family time? Could that encourage people to schedule more time with their family? Csikszentmihályi thinks it is highly likely.

What Csikszentmihályi expresses is that a simple reworking of a technology, or even the interface with a technology, can have significant positive effects. For example, calendars are generally focused on one individual, but there is no reason why there could not be family calendars scheduling the family’s time together. In addition, there is no reason why business productivity software could not be reworked to improve family life.

Csikszentmihályi also points out that childhood mirrors adulthood. In the age of farming, children often played outside and got to know the land, unconsciously developing skills they would need later in life. Today’s children play video games, often in solitude. This, however, is not so

dissimilar from working in a cubicle. The environment of play in childhood can be a reflection of important adult skills in the adult environment, and a society afraid of change is quick to discount this.

This is all a way of supporting the same point: it is not what technology is used that matters, it is how the technology is used. A simple rework or reimaging of a technology can have a significant effect both on how it is used and how it affects the life of a user. If the needs of the populace are truly taken into consideration over corporate needs, these effects can be huge and largely positive.

¹Zeitgeist – in direct translation from German it means “the spirit of the times” or “the spirit of the age”.

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Chapter 4:

Technology as a social compass

Natasha Dwyer
Victoria University

Natasha Dwyer is a lecturer at Victoria University in Australia and a researcher of trust in digital environments. She is interested in user interfaces and how they affect communication.

If Dwyer had a motto regarding the increasing use of media and Information and Communication Technology (ICT), it would be “don’t



panic!”. While she agrees that our habits and quite possibly our brains are changing as a result of exposure to and use of media, she does not agree with what she sees as an increasing “moral panic”. People have lost sight, she says, and are too worried about classifying things as “bad” and “not bad”. The real purpose behind technology of all sorts is to help people navigate or negotiate a situation, and if it accomplishes this purpose, then it is a positive thing.

That said, people’s habits are noticeably changing, but Dwyer resists putting value judgments on

these changes. For example, the now near omnipresence of photographic capability has made people much less careful about taking pictures. While this may make people treasure individual photos less or become preoccupied with taking pictures instead of living in the moment, it has allowed many more moments and situations to be captured and remembered. It is not as if this ubiquity of photography can be classified as positive or negative – it is just different.

Another difference stems from the consequences of technology making things faster and more efficient. This increases the pressure for people to accomplish more. Communication that used to take days now takes minutes, calculations and processes that used to take weeks can be done in seconds, and this in turn makes nearly everything seem more urgent and more pressing. Overall, she believes this is making people more worn out and more stressed.

The other side of the story, however, is increased potential for collaboration. That same eradicated delay in communication is allowing human beings to come together to accomplish new and wonderful things in ways not possible even a few years ago. While these benefits might outweigh the negative consequences, Dwyer thinks that better interface and system design could help people manage their time and interaction with technology in a more optimal way. For example, artificially re-introducing delays, such as a delayed email send, might keep channels of communication and collaboration open while easing time pressure, reducing stress and giving everyone time to think and process information.



In general, Dwyer thinks the way that technology has developed sometimes shows a misunderstanding of what people actually want or need. Text messaging, for instance, is something that was once thought to be only useful or needed by engineers. The current ubiquity of text messaging lays to rest that idea. The problem, says Dwyer, was the misunderstanding of people’s need to communicate in a non-emotional way. For communicating some kinds of information, being able to distil a message down to its emotionless essence is actually ideal for many people.

That does not mean, of course, that Computer Mediated Communication (CMC) should also be able to have all the richness of face-to-face communication, if that is what the user desires. Already, technologies such as video chat have allowed for friendships and relationships to flourish across long distances where previously they might have faded. Technological innovation will of course continue to push developments in this area, but the important thing to understand is

that one interface or type of CMC is not better or worse in general. It all depends on the context, and what is best for the user in that context.

While text messaging and video chat are two examples of near real-time communication, there are a whole host of other uses for CMC, including social networking and sites like Facebook that have come to dominate the dialogue about such technologies. Despite concerns about the long term social impact of such media, Dwyer points out that Social Networking Sites (SNS) can actually help people develop social skills. For example, she talks about how SNS was used in conjunction with eBay to help traders learn how to build trust with customers. Sites like Facebook also help users maintain relationships in the absence of physical proximity.

That said, SNS do allow people to modify their public image, and contact only through those sites does dilute what you know about someone. Dwyer believes that the ambiguity of the web can make people more superficial and that some rich communication with



It is not necessarily the complexity of interface that breeds user exclusivity, but rather the novelty. Older users are also more likely to become frustrated if they cannot immediately learn how to use a particular piece of technology, and are even more afraid of breaking things. Nonetheless, they are eager to learn, and a combination of inclusive interfaces and opportunities for technology education will lead to a generation of older citizens with a far better grasp of how to use modern technology to improve and enrich their lives.

friends is necessary for deeper relationships. Once again, the context in which the technology is used determines the extent to which its effects are predominantly positive or negative.

One much-debated concern that Dwyer does share is the potential for constant multitasking to degrade the quality of concentration. Splitting attention causes task performance to suffer, she says, because humans can only really attend to one thing at a time. Constantly breaking that attention means that people must do more work just to sustain concentration. Of course, people can do more than one thing at once – walking and talking, taking notes while listening, etc – but the important thing is to notice when one task really requires deep focus and to have the self-control to really lend that task the full attention it needs.

As the world population ages, Dwyer also sees the need to increase the inclusivity of interfaces for older users. One thing that older people need is the ability to relate an interface back to an interface they are familiar with.

Dwyer ultimately believes that technology has the potential to improve the collective world-wide well-being. She cites the ability for increased connectedness, whether that be between distant friends and relatives or between a woman in the bush and a doctor in the city. The CMC-enhanced world of the future will hopefully see more tolerance, international collaboration, and social fulfilment for every type of person. All that is needed is a realistic awareness of the facts and an open mind.

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People have lost sight and are too worried about classifying things as “bad” and “not bad”.
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Chapter 5:

Ages, attitudes, and the deceptiveness of ease

David Good
University of Cambridge

David Good is a Social Psychologist at the University of Cambridge and a Fellow of King’s College. His research interests lie in human communication and the design and use of new information and communication technologies.

Good observes that worrying about the impact of technology on people’s lives is nothing new and has probably been around since humans started making even the most rudimentary devices. People frequently understand the present by comparing it to the past, which is often fondly remembered as simpler and less troubled by technology. When one looks at the historical facts, however, those memories rarely match the reality. To accurately compare past situations with present conditions, it

is important to recognise the different things that people are doing in their world, the purposes they pursue, and the mechanisms and the resources they deploy. Technological advances have an impact on the last of these and may create new needs, but human desires and purposes are the constant backcloth.

Of necessity, new technologies are overwhelmingly invented by the older generations, for many of whom being a teenager is only a distant memory. Text messaging is a good example of such a system. Texting protocols were first specified by engineers who thought that it would be useful for testing the integrity of a network. When made available to a younger generation, however, they soon saw how to exploit the opportunity it provided. It allowed them to communicate quickly with somebody else, cost next to nothing, and removed some of the social complications around voice and face-to-face communication, especially at the age when making relationships is a difficult and challenging business. The pressing and anxiety-provoking

demands of a face-to-face encounter could be replaced with the chance for a more considered and perhaps more calculated engagement.

Good points out that older generations cannot understand and socialise technology the way that younger generations do. Growing up with a particular technology as a given provides the basis for the individual to recruit it to their needs and thus embed it in their cultural frame. As put so eloquently by Douglas Adams: "Anything that is in the world when you're born is normal and ordinary and is just a natural part of the way the world works. Anything that's invented between when you're fifteen and thirty-five is new and exciting and revolutionary and you can probably get a career in it. Anything invented after you're thirty-five is against the natural order of things" (Adams, 2002).

To illustrate why younger generations are more at ease when using novel communication technologies and therefore play such an important role in developing practices they can support, Good mentions pidginisation and creolisation. When two or more

groups that do not share a common language come into contact for the first time, they develop a pidgin: a reduced form of a natural language that contains a subset of words, sounds, or non verbal gestures drawn from their own languages. Younger members of these societies hear bits of the pidgin, unaware that it is not a full natural language, and infer what it would be like if it were. These inferences lead to the development of a new language, often called a creole. A very similar thing happens with technology, and because this socialisation and culturalisation of new technology is driven by younger generations, these societal and cultural changes can be greeted with fear instead of acceptance as older generations see society shift away from the familiar model with which they grew up.

Good believes that many of the purposes behind interpersonal interaction have been established by a long evolutionary history, and while they remain fairly constant, the means for accomplishing these purposes have often been changed by the technologies through which we present ourselves to the world

and communicate with one another. It seems unlikely that technology will change those values and purposes, but our capacity to achieve them might nevertheless be affected. Plato in Phaedrus has Socrates deploring the effect which literacy will have on human memory (Plato). And yet, in the years since classical antiquity, while civilisation as it was known then may have gone, the political and ethical debates which mattered to them still matter to us.

When communicating information with others, it must be remembered that people are doing many things at the same time. They are establishing and maintaining their identity, their relationships, and conditions of mutual understanding. They are tracking possible misunderstandings and correcting them. They are directing one's own and other people's attention and they are constantly accessing each other's memory resources amongst other things. We do many of these activities without much conscious reflection, and they depend on extensive tacit knowledge. We only become aware of what is important when interaction fails or when new technologies or circumstances require us to render explicit that which was implicit. As an example, Good mentions the case of a male transsexual Agnes studied by Harold Garfinkel in the early 1960s (Kessler and McKenna, 1985) who went through transgender surgery at the age of 20. Agnes discovered that the pathway from male to female required more than surgery and a change of clothes. She discovered that there was very much more to learn about how to behave instinctively and automatically as a female, and that other women would

Growing up with a particular technology as a given provides the basis for the individual to recruit it to their needs and thus embed it in their cultural frame.

readily spot that something was not quite as it should be when Agnes presented herself as a woman. It is commonly observed that this holds true in even the limited environment of chat rooms too, and that men presenting themselves as women are often quickly found out.

Although there is a long history of technology being successfully incorporated into society, Good says that this may not be a simple trajectory and that each successive generation may moderate the excesses of their predecessors. When previous constraints on the pursuit of human goals and needs are removed, problems may arise before the culture of use settles down. He believes that people can push themselves relentlessly on anything, and technology, in all fairness, is just one way of doing it. He gives the example of food, which is necessary for physical well-being, but can be highly damaging if consumed in an unmoderated way.

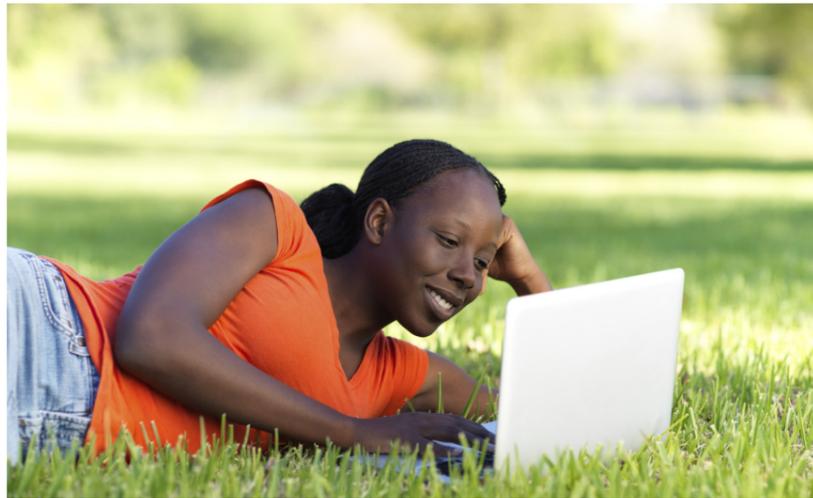
Good has one specific concern at the moment. In the past, he says, in order to communicate with others, there was a cost, always in terms of effort and sometimes financially as well, incurred on both the sender and the receiver of information. Today, people can send huge amounts of written material to other people quickly and with almost zero additional cost. As a result, people's capacity to burden other people has greatly increased and there is no longer a constraint in the structure of the system that moderates one's demands on other people. Without social interaction, there is no society as we know it nor the benefits which follow. Any technology which

supports interaction carries great potential for good, but like any technology it can cause harm too. This potential imbalance between the two sides of communication can threaten the sense of human mutuality which is the bedrock of our relationships, organisations and societies. Given our past experience it seems likely that human cultures will socialise and humanise the technology, but the trajectory may not be simple and there may be bumps along the way.

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Chapter 6:

ICT, mindfulness, and well-being

Felicia Huppert
University of Cambridge

Felicia Huppert is a professor at the University of Cambridge in the Department of Psychiatry. She is an expert in well-being and the factors that affect it across numerous populations, and gives significant insight into the role media use can play.

Well-being, she explained, is not the same thing as happiness; it is a combination of feeling good and functioning effectively. Happiness is a passive response to circumstances, whereas well-being is defined by one's active interaction with the world. There are physical, mental, and social aspects to well-being, and media use has the potential to affect all of them. On the level of society, well-being is the ability to connect with one another and having a sense of belonging within and contributing to the community.

Not surprisingly, Information Communication Technology (ICT), and media in general, have both positive and negative implications for individual well-being. Huppert describes, for example, the joy a grandparent can get from reading their grandchild a bedtime story over Skype video chat, whereas even a few years ago they might have had to wait months or years to get a similar experience. The prevalence of ICT, and specifically newer technologies like video calling, does really allow the maintenance of relationships across great distances, which contributes to social well-being by giving people a feeling of connectedness.

In addition, one thing that Huppert has studied is the relationship between various personality traits and well-being. The strongest correlation she has found is between extraversion and increased well-being. ICT has the potential, in her opinion, to allow otherwise introverted people to become more connected via online communication, and could therefore lead to an increase in well-being for these individuals. Although in-person communication skills are important,

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Persistent technology use, however, is not without its risks and drawbacks. One thing Huppert has found in her research is that planned downtime – time to let the mind be still and quiet – is essential for optimal well-being.

People who take no time to disconnect from technology risk a kind of mental fatigue that can have long-term negative consequences. The good news is that it is relatively easy, with a bit of forethought and planning, to start fixing the problem. Although larger periods of time for calming and reflection are ideal, even taking a few minutes of downtime a few times a day can be powerful.

The best technique for calming the mind is known as mindfulness training.

It teaches people to become aware of what they are experiencing in the present – their bodily sensations, thoughts and feelings – and to accept them without judging them. There is solid evidence from behavioural science and neuroscience for the benefits of this technique for physical and mental health, for cognitive function, and for relationships.

Huppert has undertaken experiments with mindfulness training in adolescents and found significant increases in their well-being. Many of the adolescents continued to practise mindfulness regularly after the training was over, reporting benefits on school work, family relationships as well as on the sports field. What is necessary, says Huppert, is for all children to be taught how to increase their well-being this way. Luckily, online programmes exist to make this training readily available, and online prompts can be provided to remind people to take a few moments to practise the techniques, which Huppert believes can help children, adults, and families in the modern world.

This is not to say that rampant use of media can be justified by taking a few sporadic minutes of downtime. There is a big difference, Huppert explains, between passive and active use of media. For example, television is a passive form of media, as it does not require almost any user interaction except for the initial selection of the programme. Many hours of any kind of passive media consumption has been shown to be bad for well-being, says Huppert, but taking planned time for calming and reflection will still help mitigate the effects.

If active media use is healthier, then one must look at how active media is being used and how that relates to well-being. Huppert references the work of Jane McGonigal, who looks at the effects of playing computer games. Gaming is an active use of media that also encourages social relationships, teamwork, and problem solving, all of which can lead to increased well-being, even online. McGonigal argues that if real-world problem solving were more like game-playing, this could potentially help people collaborate more and actively participate in solving more of the world's problems. Huppert readily agrees with this.

Huppert also believes that ICT can actively help people with conditions such as autism that might make face-to-face interaction difficult. As well-being depends on the ability to have fulfilling social interactions, not necessarily in-person ones, there is a whole host of opportunities for individuals with various disabilities to turn previously negative interactions into positive ones with the assistance of technology. This is also likely to increase overall well-being.

While one single technology is not likely to have an extraordinary impact on well-being, understanding healthy ways of relating to technology has the potential to increase well-being greatly for all technology users. Education about downtime and media use is critical for individual and societal well-being as we move into an era dominated by ICT technology interaction.

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Chapter 7:

Videogames: cause or effect?

Daniel Johnson
Queensland University of Technology

Daniel Johnson is a Senior Lecturer and the Bachelor of Games and Interactive Entertainment at the Queensland University of Technology in Australia. He has been researching videogames, the people who play them, and the psychology behind human-computer interactions for over a decade.

mainstream pastime, with 73% of a representative UK sample indicating that they have an average weekly playtime of over 5 hours (UK National Gamers Survey, 2009). While the relative proportion of people playing videogames is unsurprisingly biased towards younger age groups, it is important to note that 42% of those over 50 years reported playing videogames. Moreover, the gap between males and females is a lot smaller than many people assume, with females making up close to half of the game playing population in the UK. These figures, Johnson stresses, are very much in line with trends around the world. Videogames are no longer (if they ever were) the exclusive domain of young males and are being played by the majority of our society.

This increase in popularity of videogames, combined with some well-publicised examples of extreme behaviour, has led to a lot of interest in the potential positive and negative influences of videogame play. Johnson suggests that some parts of the media are guilty of presenting an overly-negative, biased view of

videogames to the public. This is not surprising, Johnson argues, as historically most forms of new media have met with an initially negative response. For example, most people are aware of the past controversy surrounding rock music and its assumed negative influence on young people. Going further back, one can easily uncover record of equivalent concerns being voiced about films and even novels. This pattern, Johnson observes, reminds us to stay as objective as possible when exploring the somewhat emotive question of the positive and negative influences of videogames.

When asked for further detail regarding media bias in reporting on the negative influences of videogames, Johnson speaks passionately about the entirely spurious link made by the media between videogame play and certain horrifying tragedies that have occurred in recent years. For example, after the Columbine massacre in 1999, a number of falsities were published, including that the young men involved had built a videogame version of their high school and practised the atrocities they later

committed. These suggestions were later shown to be categorically incorrect. Moreover, in 2002 the US Secret Service concluded there was no link at all between the shootings and any form of videogame play. However, at the time of the tragedy the alleged link between videogames and the violence committed was widely reported.

Johnson argues that one of the major confusions made in discussions of videogames and their possible negative influences (including violence) is around the question of causation. The vast majority of young people have had at least some contact with violent videogames. Hence, when a violent act is committed by a young person, it is statistically likely that they have played violent games. Critically, however, this does not mean that the latter caused the former. Indeed, if such a link existed, we might expect to have seen a steady increase in the violent behaviour exhibited by young people as videogames became more popular. In fact, Johnson observes, the opposite has occurred: in most industrialised nations, adult and youth violence has substantially declined over the past decades.

Johnson goes on to observe that some scholars in the field have argued that videogame play causes anti-social or aggressive behaviour. However, much of this research is based on the discovery of statistical correlations. Johnson suggests that this is a prototypical example of the principle that “correlation is not causation”. In other words, just because two things (A and B) occur together does not mean that one causes the other. Moreover, it

does not provide an indication of whether A causes B, B causes A, or a third factor, C, causes both A and B. For example, the fact that more people drown on days when a lot of cold drinks are sold does not mean that cold drinks cause drowning (obviously, in this example a third factor, hot weather, means that more people are swimming and more people are buying cold drinks). In the case of videogames, evidence that people who play videogames sometimes exhibit aggressive behaviour does not necessarily mean that videogames cause aggressive behaviour. In fact, it may instead be that aggressive people are drawn to violent videogames. Recently, research has been published that supports this idea (Przybylski, Weinstein, Ryan, & Rigby, 2009).

Christopher Ferguson and colleagues (2011) recently published a study involving an international sample that showed a relationship between media violence exposure and violent crimes and depression. However, once personality features were taken into account, any link between exposure to media violence and violent crimes/ depression disappeared. This finding suggests that a person’s personality is a better explanation (than whether they play violent videogames) of whether they are likely to commit a violent crime or become depressed. Johnson suggests that while further replication of this initial finding is needed, this research clearly shows that the picture is more complex than has been commonly assumed.

In fact, Johnson continues, there is evidence to suggest not only that videogames do not cause depression, but rather that the opposite may

There is evidence to suggest video games do not cause depression, but rather that the opposite may be true.



Legislating against excessive time spent playing videogames makes no more sense than legislating against excessive eating or exercising.

be true. Work by Russoniello and colleagues (2009) is significant in that it applies well-respected techniques (such as randomised controlled trials) and a range of instruments (from surveys to measures of electrical activity in the brain) to the possible use of videogames as a means of improving mood and decreasing stress and depression. The initial findings are very encouraging, Johnson enthuses, showing evidence of a clear link between videogame play and improvements on both subjective and objective measures of mood, stress, anxiety and depression.

While there is no evidence of widespread negative influences associated with videogame play, it is clear that too much of any form of media (television, books, videogames etc) can be a bad thing. Here, Johnson points to the work of Mark Griffiths (2009) who has observed that while moderation is important, legislating against excessive time spent playing videogames makes no more sense than legislating against excessive eating or exercising.

A balanced life, Johnson argues, includes an appropriate level of

engagement with recreational media. However, we are seeing what is being labelled addiction to videogames appearing in a minority of cases. In countries such as China and South Korea there have been cases of death resulting from people failing to attend to their basic personal needs in order to spend more time playing videogames. This has led to these countries implementing measures to limit the time children spend playing, including online gaming curfews and a system that reduces the in-game rewards received after set periods of time. In addition, while it is clear that some players in these countries are exhibiting a problematic level of engagement, it is not yet clear what proportion of players exhibit this kind of pathological play.

A key question is whether games are causing the pathological behaviour, or whether some other variable (for example, a pre-existing psychological imbalance) is causing people to become obsessed with videogames. To this end, the work of Przybylski, Rigby and Ryan (2010) suggests that it is people with low need satisfaction in other areas of their life that develop

a disordered pattern of videogame play. Moreover, their findings indicate that disordered videogame play is a symptom rather than a cause of psychological distress. Johnson concludes that these issues require further attention from researchers and health workers alike. If it is the case, as is often argued, that the rates of addiction are much higher in specific countries, then consideration needs to be given to what it is in these cultures that leaves people more vulnerable to videogame overuse. Irrespective of any interactions with culture, it is essential that we answer questions about the causes of and treatments for such aberrant behaviour.

On a brighter note, Johnson observes, there is an increasing body of evidence for the positive influence of videogames. While the field is young, there is already support for improvements in visualisation, experimentation and creativity resulting from videogame play. Many games teach the player about strategising and problem solving: players are required to analyse and evaluate complex situations and

make plans for action. Another area in which videogames clearly have a positive influence is collaboration. Videogame players are very often required to collaborate in order to succeed in the games they play. This clearly benefits players in terms of learning to work well in teams and in making connections with others. In this area Johnson references Jane McGonigal's ongoing work on how game playing can enhance personal happiness and help society. Similarly, it is clear that video gaming is often a social activity – a great deal (though not the majority) of videogame play occurs with others (either in the same room or online) and trends suggest that this social proportion of play is steadily increasing. Moreover, there is evidence (for example, from researchers such as Jeff Brand,

2009) that players prefer to play with others when that option is available. Beyond the socialising that occurs during play, it has been noted that videogames are unusual (among other forms of media) for the participatory culture shown by fans. Videogame fans show a remarkable tendency to engage with game developers and each other in terms of producing guides for how to play games, creating fan fiction (e.g. novels about the characters in games), creating modifications to existing games, and building online communities around their favourite games.

Overall, it is clear that a more balanced view of videogames as an entertainment medium is developing. Asked to sum up, Johnson states

Game playing can enhance personal happiness and help society.

that he would encourage people to explore the positive impacts of videogames while always maintaining a healthy balance in all the activities they undertake.



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Chapter 8:

The digital divide: a gap in education

Marie-Jose Montpetit
Massachusetts Institute of
Technology

In a world where people are getting farther apart physically, Marie-Jose Montpetit of the Research Laboratory for Electronics (RLE) at MIT studies how to bring them back together through technology. We were able to sit down and talk with her about the impact of technology on all things social.

The idea of “traditional” social skills, and the concern about the loss thereof, comes from an idea of social interaction that is quickly becoming obsolete. Most people have a plethora of options when they want to be social, ranging from a face-to-face encounter to chatting with friends on Facebook. Montpetit worries that in an increasingly mobile world, we are not doing enough to teach the relevant skills to our children. Fearing the supposed (and

still hypothetical) degradation of one set of skills does nothing to instill in youth the set of skills that will make them most successful and fulfilled.

Montpetit’s main area of research over the past few years has been Social TV. Television is an example of a medium that once brought people together socially but is now viewed as isolating. The right technology and interface could make TV a social experience again, albeit not necessarily an in-person one. In addition, although in-person interaction remains important, in a world where friends and family are often thousands of miles away, the important thing is to foster the sense of social connectedness that can enhance overall well-being.

However, as Montpetit explains, modern technology creates fear of the unknown. People are afraid of privacy issues as they release more information about themselves to the world via technological channels that they do not fully understand. The newest technology is rarely well-mediated, creating user risk. Furthermore, even the technologies

with the best intentions can be used to harm others, as with the rather salient example of cyber-bullying.

Because of this reticence, it is important that modern technologies respect the underlying cultural norms of a society. Montpetit gives a Social TV design example: users do not care, as once thought, about the random Tweets (i.e. comments posted on Twitter) of people they do not know, a feature that was once included in some Social TV designs. Upon reflection, this is not really surprising. It would be just as unnerving if a stranger approached the same user on the street and gave their political opinion or even recommended a movie. Understanding how users will react to technology and building trust through respect of user needs is critical, especially when ignorance among novice users is such a problem.

The biggest problem with perceived technology threats, Montpetit explains, is that it prevents parents from educating their children about technology. Since many adults do not fully understand what their children are doing with technology, they

either assume they know what they are doing or block the technology entirely. Unfortunately, this does nothing to educate children about how to use technology responsibly or to inform them about possible risks, ranging from unintentional public embarrassment to various forms of cyber harassment.

Blocking Facebook in schools is not the answer, Montpetit says, and actually prevents teachers from demonstrating responsible use to students. There are lots of distractions in everyday life, even without technology, and in the past it has generally been seen as a good idea to teach children how to balance work with play instead of banning play entirely. Now that the work and play devices have merged, however, adults are trying to control how devices are used instead of showing students how best to use them. In the long term, this will probably hurt children more than it helps them.

Of course, this does not mean that children should be given a free rein with the technology they use. Montpetit acknowledges that too much multitasking and lack of

There are lots of distractions in everyday life, even without technology, and in the past it has generally been seen as a good idea to teach children how to balance work with play instead of banning play entirely.



focus is bad for education, and that allowing rampant multitasking in an educational environment does not do anyone any good. Once again, the key is to show children how to use technology as a tool and teach them to understand the effects that technology has on them.

Montpetit points out that we are underutilising the potential of technology to impact education positively. Social TV, she says, could actually be used to incentivise learning if presented correctly. TV is a medium widely loved by children, so if TV became interactive, social, and educational, it could encourage learning outside the classroom, possibly with people with whom students do not generally have a chance to interact.

Sharing has always been a way of forming social bonds, and Social TV provides the potential for media sharing, which can have a similar effect. This is an example of a way in which Social TV could be used as a platform to teach not just school subjects but also social subjects like etiquette, respect, and trust.

One critical barrier that needs to be broken down for these advancements, however, is the ignorance surrounding new technology and the idea that children and adults have different fundamental reactions to technology. The idea that there are “things that kids like” and “things that adults like” allows adults to demonise younger people’s use of technology instead of trying to help them use it most beneficially. Once adults come to understand and respect technological use, a whole new world



of educational and collaborative possibilities will open up.

What it really comes down to, according to Montpetit, is increasing education about technology and eradicating ignorance. If we teach about responsible technology use and the consequences of irresponsible use instead of just trying to control how and when technology is used, we will raise a generation that can use technology to its fullest potential as a tool and not just a toy. In addition, the social opportunities afforded by technology will help create a more connected, socially-fulfilled world.

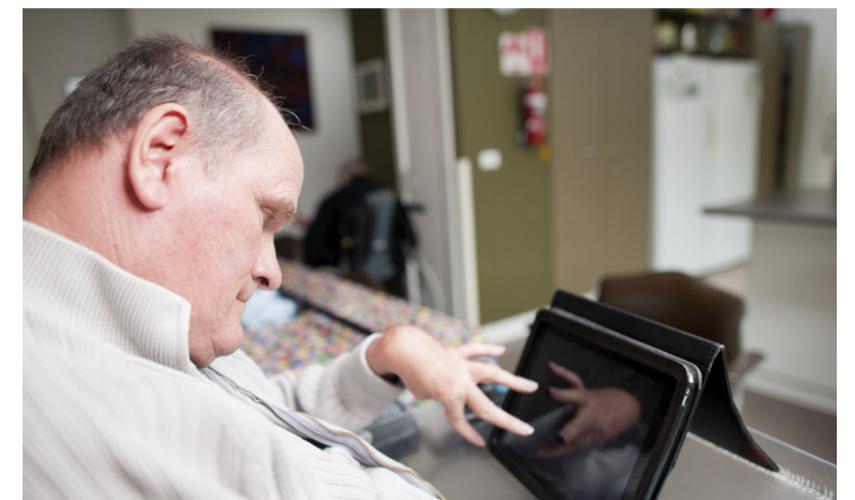
Chapter 9:

Individual differences: the benefits and consequences of ICT

Rosalind Picard
Massachusetts Institute of Technology

Rosalind Picard deals with the interaction of people and technology, and specifically how to reintroduce things that are typically lost with CMC. Her area is called **Affective Computing**, and she is changing the way in which people, particularly those with disabilities, communicate.

Picard was asked if she thought that the cues-filtered-out problem of Computer Mediated Communication (CMC) would lead to a deficit in social skills later in life – for example a problem reading facial expressions. Surprisingly, the first thing Picard did was point out that there are already large groups of socially functional people who cannot read facial expressions: the blind. Similarly, deaf people cannot hear changes in intonation that represent a whole host of emotions, and yet they too learn social skills despite not having those cues.



It is also misleading to characterise social interaction as purely positive. Even the biggest extroverts can find social interaction exhausting at times, and technology allows for a lot of communication to happen in a much more relaxed, less energy-intensive way.



Picard explains that for these people, CMC actually may help them more than it could possibly hurt them. People who have trouble hearing or speaking can find their ears and voices through CMC. Introverts can reach out socially. Even autistic children can start to learn to process social behaviour.

It is also misleading to characterise social interaction as purely positive. Even the biggest extroverts can find social interaction exhausting at times, and technology allows for a lot of communication to happen in a much more relaxed, less energy-intensive way. The use of technology remains an entirely individual decision, with different people adapting differently and preferring different ratios. It is unfair to assume that there is one ideal level of use.

While sometimes relationships that start via CMC can be disappointing when face-to-face interaction finally occurs, sometimes it can be a good way to start a relationship. Picard tells the story of her father, a military veteran, who started chatting online with other vets. When he finally met

one of his new friends, he discovered that he was wheelchair bound with a speech impediment. Had her father not had CMC to get to know him first, he might never have talked to someone who eventually became a close friend.

What is important to understand is that CMC may be more beneficial for some groups than for others. While it might enable non-speaking people to communicate, it comes at an opportunity cost for those who can speak: when they are using CMC, they are not generally practising their speaking skills. While there is no proven risk to frequent CMC use, Picard cautions that it is probably not a good idea to have too much communication take place exclusively that way. Of course, there are also the rare but not unheard of cases of physical injury due to excessive use of some technologies, like "nintendonitis" from playing too many video games, or like a girl Picard encountered who had both thumbs in braces from texting too much.

While CMC does filter out many social cues, Picard is using her own technology to help reintroduce them. Her lab has developed software that can not only read facial expressions but also alert someone as to their conversation partner's probable mental state. While this may be second nature to most people, there are many people for whom understanding facial expressions is a challenge, and this tool is a great help to them. In addition, the same technology might be used in the future to help reintroduce some of the filtered out cues in CMC for all participants.



One interesting thing about CMC is how it has fostered the development of something between a culture and a community. The internet has enabled people with similar interests from around the world to come together virtually. At the same time, CMC has spawned a kind of "internet culture" with its own rules of etiquette and codes of behaviour. What is interesting is when the old and new cultures come together. Picard tells the story of a Muslim co-worker with whom she would often video chat. If there were no potential for a man to see her on the screen, then she would leave her headscarf off, but if a man entered the room or was nearby, she would put it back on. Even though there was no potential for the woman and man to interact physically, the cultural norm was still respected. As time goes on, it is likely we will see more co-evolution of online and offline culture.

Technology has also changed our expectations, particularly about how and when communication should occur. In the past, work was mostly independent, with almost all collaboration taking place face-to-

face. Now, however, a good deal of collaboration happens over IM and email. Information can be exchanged in minutes that might have once taken days or weeks. While this can speed up the pace of work, it also creates a false sense of urgency and dependence that can be destructive long-term.

Picard also agrees that the kind of random reinforcement that happens with email can be addictive. The larger problem, she says, is that people really are not aware of when they are in control of technology and when technology is in control of them. Awareness of the problem is the first step in finding a solution, and whether or not CMC can actively help an individual in their daily life.

People really are not aware of when they are in control of technology and when technology is in control of them.



Chapter 10:

Quality vs. quantity: technology as an educational tool

Mitch Resnick
Massachusetts Institute of Technology

Mitch Resnick is a different kind of education expert. He has dedicated the last few decades to designing toys that get children passionate about subjects ranging from programming to engineering to art. Perhaps most importantly, he has also provided ways for them to form collaborative groups online so that they can share their work and give and receive constructive feedback.

If anyone is in tune with how technology might be changing the youthful mind, it is probably Resnick. However, he does not seem to have too many concerns about young people's increasing use of technology. According to him, it is not how much

technology you use that matters, it is how you use it.

Resnick believes that the traditional model of education as knowledge transmission is flawed. The most impactful educational experiences, he says, come when people are actively engaged in creating, designing, and experimenting. New technologies can facilitate creativity by making information more accessible and allowing people to share their ideas globally. All of this makes learning more exciting. After all, everyone learns better and faster when they really care about what they are learning.

In response to the assertion that such technology could exclude more traditional models of learning, like reading a book, Resnick counters that there is no reason that has to be true. Most people will sit down and read about something they really care about, and even children with hypothetical attention deficit suddenly seem to be able to focus on something they find engaging and interesting. It is not that book-reading as an art has to be bulldozed

to expand the technological highway, but rather that children must be encouraged to learn by tying what they learn to their passions, watching how others make use of the information, and to learn by experimentation and collaboration rather than by rote.

Clearly technology can be a powerful educational tool, but Resnick worries that not nearly enough is done to teach children how to use technology responsibly. One problem is that parents assume that children know everything about technology, and subsequently do not feel it necessary to discuss appropriate use of new technologies. Adults and children view many technological tools very differently – adults often respond with a mixture of scepticism, awe, and fear, while children merely take them for granted. Education about effective technology use is critical for healthy child development.

Unfortunately, Resnick points out, the very nature of modern technology makes it all too easy for it to simply reinforce some less effective approaches to education. The internet is a great tool for the passive delivery of information, so some educational institutions have been thrilled by the potential to put things like lectures

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Students should see themselves as active creators of ideas and information, not passive information receivers.
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online. Some schools have even begun replacing some lectures with “online class”, where many students can listen in (or watch recorded lectures) at the time and place of their convenience. That is fine, explains Resnick, as long as it is used as an opportunity to transform what happens during class time. If a lecture is just as effectively delivered online as delivered in person, then why are institutions wasting valuable class-time on something that could just as easily be obtained by watching a video? The best learning experiences involve more than delivery of information. Class-time should belong to active learning, where students are actively engaged in exploring, experimenting, and expressing themselves. Schools at any level should not be trapped by the recent “computer-as-teacher” phenomenon.

Resnick believes that students should see themselves as active creators of ideas and information, not passive information receivers. It is all too easy to allow technology to simply “deliver answers” instead of being an aid in an active investigation or creative process. The latter, Resnick argues, is the most effective and healthiest way for technology to be used educationally.

Resnick has also worked for years with Computer Mediated Communication (CMC) collaboration and has seen how children make excellent use of it. It is hard, therefore, for him to imagine that CMC in and of itself will somehow destroy or limit the social skills of tech-savvy children. Once again, the problem comes down to the way children use the technology. There is a time and place for CMC, and a time and place for Face-to-Face (FtF)

communication. As long as children have a balance and understand appropriate behaviours for both environments, parents should not really be worried about children using CMC to communicate.

Resnick also takes issue with those who try to use neuroscience as overarching proof of their conclusions, whether they be that technology is a positive or negative influence. Neuroscience, he explains, is not necessarily the right level to look at things. In most instances, careful observation and analysis of a child's learning process can yield more insightful results than scans of their brain activity.

The truth, says Resnick, is that too much of any one activity is a bad thing. A child who only communicated through CMC would probably be at a social disadvantage, just like a child who only read books instead of sometimes playing with LEGO bricks or playing outside. Children need to be encouraged to explore the world, and technology can open many doors that were not previously available.

Resnick agrees, however, that someone using technology irresponsibly can find that technology is having an undesired influence on their life. Indeed, some people allow technology to control them. It is important that children learn different ways of using and relating to the technologies in their lives. The most important thing, says Resnick, is that children learn to be in control of technology and how to prevent technology from being in control of them.

Chapter 11:

What vs. how: why the medium is less important than the message

Rebecca Saxe
Massachusetts Institute of Technology

Rebecca Saxe is a Professor of Brain and Cognitive Science at MIT. She was asked to voice her opinion on how technology is affecting our brains. The answer? Probably not as much as we worry it might be.

Ironically, the meeting with Saxe took place over Skype video chat, yet another technological innovation that is changing the way we communicate. Or is it? Despite the unceasing innovation in the market of communications technologies, deep down, Saxe suspects that we are still working with the same old brains that are still largely processing information in the same old way.

For example, adults may worry that children are conducting fewer of their social interactions Face-to-Face (FtF). Parents may fret that their sons and daughters spend all day on Instant Messenger (IM) instead of seeing their

friends in person, or even talking on the phone. Saxe, however, muses that a lot of valuable social information has always been gathered in a non-FtF context. Gossip and storytelling have always served as important ways to teach, and to learn, social norms. Hearing stories about absent – or even imaginary – people and actions reinforces what acceptable behaviour is, and what a culture expects from social relationships. This non-FtF “technology” has been around for millennia.

We should probably be concerned less with whether we have changed how we are communicating social norms, and more with whether we have changed what we communicate about social norms.

Ideally, the question of whether modern technology is changing human social development should be an empirical question, relying on quantitative and unbiased measurements rather than anecdote and personal impressions. Few such studies exist – and probably for good reason, Saxe notes. Such a study would be very hard to conduct:

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We are still working with the same old brains that are still largely processing information in the same old way.

who would be the control group, developing without exposure to technology, but in an otherwise similar culture? Could there be a culture that was meaningfully similar to ours, that was not perfused with immediate electronic communication? Furthermore, even if we had comparison groups, what would be measured? Few accepted quantitative measures exist that capture social competence and fluency in children after age 5 or 6.

In some sense, human beings are hard-wired for social interaction from birth. In the hours after birth, human babies already prefer to look at a human face (even a schematic face with just eyes and mouth in an oval shape) and prefer to listen to a human

voice speaking their native language. Within a few months, babies are attracted to social interactions: the turn-taking, call-and-response pattern of normal social interaction holds their attention, but if a live interactive mother is replaced with a video-tape of the same smiles and coo-ing, babies lose their interest (and occasionally start to cry!). Apparently, even babies just a few months old can tell the difference between a real (in technical jargon, contingent) interaction and a video tape.

Interestingly, in these studies, babies seemed perfectly happy to have a “real” social interaction with their mothers over CCTV – the Skype of the 1980s – as long as there was no time-delay between the babies’ actions and the (image of the) mother’s reactions.

On the whole, Saxe feels pretty sanguine about children’s ability to absorb new technologies, to adapt to them, and to develop the social competence and fluency they need to survive in our modern culture. It is common, and perhaps natural, for each generation to view new technologies with suspicion, and to worry especially about the impact

of these technologies on the social development of the vulnerable members of society. Two hundred years ago, that dangerous modern technology was the novel, Saxe reminds us. People worried that novels were addictive, dangerous for both reason and imagination; novels, it was feared, pull people away from real life and real social interactions, leading to dissolute abandon of social norms. Now, parents are generally thrilled to see their children voraciously consuming one Harry Potter after another.

In the absence of empirical evidence to the contrary, Saxe is inclined to expect a similar evolution in our attitude towards our modern addiction: computer mediated communication.





Chapter 12:

Old norms pervade, but new problems arise

Shifu Yan
Shanghai Jiao Tong
University

Shifu Yan is a professor at Shanghai Jiao Tong University. His research interests lie in behavioural psychology and human resource management.

Yan explains that people have different perspectives on the impact of modern communication on the human brain. In the field of psychology, there is no strong consensus on whether or not the persistent external stimuli from Information and Communication Technology (ICT) influence the nervous system in some quantifiable way. Human emotions such as happiness and anger can generate chemical changes in the human brain, but these changes are hard to measure directly.

Nonetheless, Yan believes that there are some effects that can be seen clearly. For example, urgency has a negative impact on the quality of decision-making. Communication technology, however, drives people

to think and make decisions in a much faster way. Speed and quality are two key variables when people make important decisions, and they often come into conflict. Faster transition of information, facilitated by modern communication technology, provides more resources to decision-makers within a certain period, but such decisions might lack detail or adequate consideration. Fast decisions are not always ideal, but more and more decisions are, of necessity, being made quickly.

The increase in online interaction has slightly changed a few aspects of society, but most aspects are still fundamentally ruled by the traditional norms.

Communication technology also makes our lives more convenient. While this shortens the time people have to search for the information they want, it also means they have less time available to think about and process that information. This creates the issue, when dealing with problems with family members or colleagues, of thinking less deeply about the true nature of the problem or how it could be solved. This increased convenience of access also leads to impatience and, consequently, lower-quality decisions. In order to maintain a healthy intellect, people need to adjust to having so much information at their fingertips. The challenge is to be able to think quickly and deeply to be able to evaluate the implications of alternative solutions instead of getting trapped in the information loop.

Yan believes that excessive task-switching also affects the depth of thinking and the quality of decision-making. The psychological theory of limited resources suggests that human attention capability is fairly limited. Based on this perspective, in the era of multitasking, some mental resources will be lost during task-switching. Even though modern technology may help gain a wider range of knowledge and information, much of the information bogs down the thought process instead of aiding analysis.

Many people have the feeling that they do not use verbal communication as much as they used to. Some people, especially some young children addicted to gaming, lose parts of their social ability in the real-world as they get

used to communicating through media such as email and instant messages. They live instead in a virtual world with fake identities and relationships. Due to the fierce competition and the pressure in society, some people prefer to interact with the computer, for example via games that simulate real-life tasks such as farming, rather than human beings.

People are still capable of offline interactions, however. In Yan's opinion, the increase in online interaction has slightly changed a few aspects of society, but most aspects are still fundamentally ruled by the traditional norms. The majority of people still objectively agree that online interaction is a tool to communicate with others. Moreover, it is difficult to define whether this is good, bad, or just different. For instance, some people think the increased prevalence of online interaction ensures that our work and personal lives will be run more efficiently and effectively. However, the opponents insist that the modern applications of communications technology are harmful to young people, especially online dating and internet addiction.

In the end, there are pros and cons to the increasing use of communications technology. ICT can improve work efficiency and save workers a lot of time. There are a great number of professional and business opportunities that can be accessed through ICT, and in addition there is great potential for increased communication across different geographical areas and cultures. This increase in communication also allows people to

share information more quickly and more efficiently. Finally, there are a lot of new opportunities for enriching entertainment.

On the negative side, there are potential social issues arising from too much ICT use such as internet addiction, risks from online dating, suicide, mental illness, problems with physical health, and even unhealthy attitudes towards sex and violence. It also may lead to some individuals having trouble distinguishing or moving between the real and virtual worlds. In addition, the internet is a place where a lot of false information can be published and widely distributed, and some of this information can rob consumers of their money through misinformation or scams.

To deal with these issues, people should first and foremost maintain healthy real-world relationships and increase self-control by making a reasonable schedule for work and personal time. Other measures might include establishing an anti-addiction system that cuts off internet time for heavy users and maintaining close relationships with family and friends through keeping old traditions and holidays (even when activities like shopping online on those days might be tempting). Finally, it is important to distinguish want from need and make sure that each family buys and uses only what it needs and does not encourage or engage in over-indulgence.

Postscript

**Anna Mieczakowski,
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We hope that you have found the thoughts, opinions, and insights in this book interesting and useful.

As described in the introduction, this book of thought pieces is part of a larger project investigating the use and impact of modern Information and Communication Technology (ICT) in people's lives, results of which will be published on the 5th of July, 2011. This project is not meant to provide decisive conclusions but rather to both add to the ongoing debate about the effects of ICT and to begin to provide guidance about how people can adapt to the prevalence of modern technology in society. If you are interested in finding out more about the results of our research, please get in touch via edc-comms@eng.cam.ac.uk.

Additionally, we are always interested in hearing about the communications experiences of people like you. If you have a story to share, please send it to us at the email address above.



Anna Mieczakowski



Tanya Goldhaber



John Clarkson

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Culture, Communication and Change:

**Reflections on the use and impact of
modern media and technology in our lives**

Editors: Anna Mieczkowski, Tanya Goldhaber
and John Clarkson

Modern communication technology makes it possible to stay connected anywhere, all the time, and the flow of information is nearly limitless. With all the benefits afforded by this newfound capability, however, come potential consequences. Following the ever increasing flow of information through our computers, televisions, and phones has been a stream of concerns about the change in how we, as humans, communicate. Will the new ways in which we acquire, process, and relate information in turn change us as individuals, families, and societies?

The University of Cambridge, in partnership with BT, ran an international research project investigating these questions. Importantly, this work was aimed at stimulating a debate based on real research and not on speculation or fear. This book is part of the output of the project: a book of thought pieces based on interviews with leading researchers in fields that look at how our use of information and communication technology impacts us all on a day-to-day basis. Their insights form a cornerstone of the project but also stand alone as a valuable collection of reflections on how we live in the modern world.

More information about this research project can be found at: <http://www-edc.eng.cam.ac.uk/comms>

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