

Rediscovering Communication in Electronic Culture

Conrad Dale Johnson*

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1 On Human Connection

The revolution in communications has been underway for well over a century, starting with the telegraph, then telephone, radio and television. It's accelerated rapidly since personal computers came in three decades ago; the internet and cell phones took only half that time to globalize the scope of human connectivity. We've had smart phones in our pockets for just a few years, and for many they're already indispensable.

From inside a revolution it's not easy to see what's going on, much less foresee long-term outcomes. So this essay isn't about where new technologies will ultimately lead us. Instead I want to talk about what they're already teaching us about the nature of communication.

Nothing is more basic to who we are as human beings than our ability to communicate, at many levels. Humanity itself may have been created by communications technology. What took us off on a unique evolutionary path, some 10,000 generations ago, may well have been the emergence of new kinds of interpersonal connection that eventually evolved into talking. [1]

To call this system of human connection "language" or "symbolic communication" is too abstract. From the day we're born we're already deeply engaged in a kind of emotional contact that's unique to our species. Our brains are genetically programmed to hook us into the web of personal interaction going on around us. We quickly learn to identify faces and sense the feelings they express, to participate in the back-and-forth rhythms of baby-talk. A full year before we begin to use words, we've become wired into other people's minds, caring intensely about how they connect with us. [2]

This web of personal presence develops into talking as our brains upload the technology of language. As this communications software gets installed in us, our minds open up to be colonized by culture. Through talking we learn to imagine the world roughly the way others do, inventing our own version of this shared reality. And as we get fluent in conversing with others, around age four, we also begin to develop that lifelong conversation with ourselves that we call conscious thought. [3]

But because this many-layered communications system is so basic to everything we do, it's hard not to take it for granted. Since it works so well and operates mainly at an unconscious level, it's difficult to appreciate what's involved in this technology of personal connection. At certain points in history, though, the invention of new communications media brought about major changes, not only in how people connect with each other but in how they were able to imagine their world.

That happened 25 centuries ago, in ancient Greece, when writing began serving as a communications medium for a significant part of the population, and became a primary channel of cultural evolution. This happened again in Europe at the end of the 15th century, when new printing technology made feasible the mass-production and dissemination of written texts. In both cases, the shift in media made possible profoundly new ways of thinking. [4]

The shift into electronic media is no less radical, though its effects on consciousness and culture are only starting to be felt. Here we're focusing on one aspect of this transformation. I suggest that the earlier transition from purely oral culture to a culture built on literacy had the effect of covering up the depth and complexity of communication, even as it made possible completely new ways of conceiving the external world, in philosophy and science. On the other hand, the electronic revolution is opening up these depths again and letting us focus on them explicitly, for the first time.

2 On the Invisibility of Communication

Before going further with the story of human connection, I want to make some comments on the structure of communications systems in general. This is partly to make contact with two previous essays I wrote for the FQXi essay contests in [2012](#) and [2013](#), aimed at interpreting the physical world itself as a communications system. [5]

Every such system has two sides, that are structured very differently:

(A) There's the explicit information-**content** of the system – not only what gets conveyed in each message, but the whole more or less coherent body of information that gets built up over time and shared between different viewpoints through these messages. (In physics, the content of the communications system is the body of objective fact that we call reality.)

(B) There's the web of real-time **connections** that actually carry all this information from one viewpoint to another. The key point here is that for any message to have meaning, the system of connections has to provide a context to which that message makes a difference. (In physics this is the context in which a particular fact becomes observable or measurable.)

The point of the two physics essays was that current physical theory conceptualizes the world as if it were only a reality, existing objectively in itself. It's just taken for granted that every detail of this reality is also physically observable – that all this information is actually communicated between local systems through a web of many kinds of interactions, a web that provides the specific kinds of physical contexts needed to make all this information measurable. I suggested the reason we've been unable to clarify the role of measurement in quantum theory, or the relation between quantum mechanics and relativity, is that we haven't understood the communications capacity of the universe as something remarkable and significant.

The point I want to make here is that it's inherent in the nature of communication itself that the (A) side – the content – stands out explicitly, while the (B) side – the connection-system that gets

the message across and gives it contextual meaning – tends to remain invisible. When you pick up the phone, you don't care how the connection is being made. Technology only works well if you don't have to pay attention to it.

Another example: if you stop and look around, right now, what do you see? Light, of course – at least that's what your eyes pick up. But this light carries a huge amount of information about things in your environment, and that information is what your brain registers. Since it's important for us to track what's going on around us, our visual processing system has evolved very sophisticated ways of parsing out the relevant content for us, making the light itself effectively transparent. Just because it functions so effectively as a medium of communication, you see right through it, to the things it lights up. When someone shines a flashlight in your eyes, on the other hand, what you see is the light.

The point is that the nature of communication itself tends to hide its own functionality. We therefore tend to think about "communication" simplistically, as though it were just a matter of transferring (**A**) data from one thing to another; as though language worked like a cable connecting two computers. In fact, though, even at the physical level, every process that can read, write, store, transfer or duplicate data involves significant complexity. And no such process can stand on its own. For example, information sent through any communications channel, such as light, always gets read and interpreted in a context of other information, carried through other channels. [6]

We have yet to develop a conceptual schema for the kinds of complexity involved in the (**B**) functionality of communicating, either physically or interpersonally. So long as we can make communication work – and we humans are uniquely good at that – we haven't needed to understand exactly how it works. For most purposes we can treat the (**A**) information-content of reality as though it were all that matters.

3 From the Spoken World to the World Written Down

For many centuries our thinking has been so deeply rooted in books, our civilization so permeated by documents, that it's hard to imagine a world in which nothing had ever been recorded in any form. Yet nearly all of human evolution took place before anyone had imagined the possibility of writing anything down. This means all pre-historic cultures reproduced themselves entirely through the medium of real-time, face-to-face conversation. And this is still the primary medium in which we conduct our personal lives. Talking is basic to human existence, and it continues to evolve today. But as more and more of the business of humanity gradually began to be done in writing, direct interpersonal connection gradually receded into the background.

In pre-literate culture, on the other hand, nothing could get passed on to the next generation unless it was said out loud to someone, with enough personal impact to get itself repeated again and again. What can evolve under these conditions – along with language itself – are evocative names and ways of describing things, rhythmic songs, rhymes and proverbs, and above all stories, together with rituals that reenact a culture's central myths in present time. Through the technology of story-

telling, everything from jokes and fairy-tales to complex mythology build up an oral encyclopedia of a culture's norms and practices. Remarkable mnemonic techniques can be cultivated by story-singing specialists like the Homeric bards, who wove the great verbal tapestries of the Iliad and Odyssey before they were ultimately written down. [7]

What does not evolve in this kind of culture are ideas abstracted from a social context, or extended logical arguments, or personal introspection. Before there were any means of recording thought, intelligence was invested entirely in the real-time situations people found themselves in. Talking was – and still is, in daily life – more a matter of doing things with people than of saying things, stating propositions. In oral culture the (A) content of speech is inextricably tied to the (B) interpersonal context. Complex and sophisticated traditions can develop over time, to govern social behavior and family connections. But novel ideas and ways of doing things can be handed down to future generations only if they can be quickly absorbed into the body of timeless tradition. So the kinds of language that support private reflection and inventive reasoning weren't able to evolve before writing came into general use. [8]

Now writing had already been used for over 2000 years, for special purposes like recording laws, religious texts and merchants' transactions, before it began to revolutionize Greek civilization in the 6th and 5th centuries BC. Two factors made the Greek alphabet a uniquely effective catalyst. First, it was simple enough to be learned by kids, so that by the time they grew up, educated people took the skills of reading and writing for granted, despite the years of practice needed to acquire them. (In contrast, the more complex skills of talking and understanding speech are picked up by nearly all children automatically, without effort.)

The other factor was that unlike earlier forms of alphabetic writing, Greek could effectively record the sounds underlying speech. The Hebrew alphabet, for example, recorded only consonants, not vowels. This meant that reading was essentially a conscious process of decoding the meaning behind visual symbols. Reading Greek, on the other hand – or Latin, or the many other alphabets that evolved from Greek – was an automatic process of "sounding out" letters, turning writing into actual speech, and listening to its meaning. (Reading silently to oneself was a very rare ability until well into the Middle Ages. Even modern readers can still hear the words in their head as they read, and slow readers may also move their tongues.) [9]

The importance of this new kind of reading was not only its efficiency, in that it could need no conscious effort. The key point is that it fostered a tacit illusion that the entire world of spoken culture could be transposed into writing, as the Iliad and Odyssey were. That means that as the culture of writing advanced, there could seem to be no significant difference between face-to-face speech – the real-time resonance of sounds conveying feelings, in specific personal contexts – and the static permanence of symbols on a page, pulled out of any direct human contact.

But the medium of writing is profoundly one-sided. What it makes explicit is the content of thought, abstracted from interpersonal connection. This is why writing technology is so powerful, because it takes the meaning of words out of any specific time and place. It creates a new symbolic realm where numbers and ideas can seem to have meaning in and of themselves. And since

anything that gets written down can be copied again and again, the written word transcends its physical manifestation on the page, becoming more immune to change than a temple or a marble statue.

In Greece and Rome, writing became not just another communications medium, but a new way for culture and consciousness to evolve. And unlike spoken language, the new medium of literature was evolved on purpose. Introspective poets and creative thinkers became famous for novel ideas and modes of expression, inspiring new generations of readers to write and be self-consciously inventive, in a new world of thought made explicit to itself. As public speech began to be recorded in writing, cultivating one's rhetorical style became a key to success in politics and society. And compared with the brilliance of poets, philosophers and demagogues, the talk of daily life came to seem just a low and debased form of language.

It was very important for the character of Western civilization that this new and purposeful channel of cultural evolution entirely separated itself from the slowly changing culture of daily life. Literature was written almost exclusively by and for men, whose family life with women and children was hardly ever mentioned. Of course men also wrote personal letters, but even there, the written word can only very distantly reflect another person's presence. What writing excels at isn't personal contact but statements of fact and general principles – the aspect of things that doesn't change, that doesn't depend on any particular context or viewpoint. Whereas speaking to someone is an action, an event unique to this particular moment in a relationship, writing freezes language so that it always says the same thing, no matter who reads it or when.

So the basic character of writing as a communications medium is to separate the **(A)** information-content from **(B)** real-time connection, and at such a basic level that the latter can seem entirely irrelevant. And so there could emerge in Greek literature a profoundly new vision of the cosmos in which the **(B)** side had completely vanished. The earliest form of self-conscious thinking was in fact what came to be called physics – deliberate reasoning about the underlying nature of things in general, with no relation at all to personal concerns or city politics.

From the time of Heraclitus (500 BC), physics reimagined the world of dynamic interaction as a static pattern, controlled by a Logos as immune to change as a written word. To envision a deeper reality behind the varied appearances of things in particular contexts was of course a tremendously important step toward scientific understanding. Yet because it focused so exclusively on the aspect of the world that can be represented in writing – and eventually, in the most abstract form of writing, mathematics – it pushed entirely out of the picture the aspect of the world we actually observe and participate in, from particular points of view in an interactive environment. And because of the illusion mentioned above – the tacit assumption that everything important can be written down – this other aspect of real-time connection between things was simply set aside, for the next 2000 years.

Since the Renaissance, modern thought has progressed by incorporating more and more of the dynamic, relational, historical dimension of things into our scientific view of the world. As just one example, discovering how life evolves through natural selection opened up a completely different way of understanding complex systems. Even the universe itself is now known to have a history.

Yet until the dominance of the static, printed word began to be challenged by new technologies, the notion of a cosmos based on timeless absolute principles seemed hardly questionable. And now physics, technically the most advanced of all the sciences, is the only one where this ancient notion still hangs on. There it still seems deeply mysterious that in the quantum realm, the information-content of reality depends on the contexts that actually measure and communicate it, through the web of dynamic interaction. [10]

4 On the New Electronic Culture

In writing, we come face to face with an objective record of our own minds. And as writing became part of everyday life – especially once print technology gave rise to a large book-reading public – a new dimension of reflective self-awareness came with it. On the other hand, living with electronic media affects us very differently. Many books have lately been published that bemoan the ill effects of new media. At least by the standards of those whose business is writing and publishing research, the experience of being on-line seems terribly shallow and distracted. [11]

It's true that to concentrate on serious issues we need to be able to be alone by ourselves. Reading and writing cultivate this sort of thoughtful isolation. Surfing the web does the opposite, with its overload of connection, popping up ideas and images faster than you can click a mouse. And it's true there are serious dangers here, especially for young kids left in front of a screen to keep them company. In our world of omnipresent entertainment, being by yourself becomes optional; children can grow up with little experience of being on their own, needing to develop their own resources. And preprogrammed virtual playmates are becoming easier to find than real ones.

Yet our culture is only beginning to adapt to the new media. And because operating within the electronic web constantly tends to suck us into it, we're all confronting the need to make conscious choices about how we deal with it – specifically, how to make space in our lives for personal connection, with other people and with ourselves. We'll return to this theme below.

But even before personal computers invaded our lives, the shift to electronic media had fostered a widespread preoccupation with the nature of consciousness, in all its various forms and possibilities. For example, the first reflections on the difference between oral and written culture were inspired by the impact of radio in the 1930's. [12] In contrast with the traditional skills of reasoning and objective examination, developed through the discipline of reading and writing, the ever more engaging electronic media draw attention to what we do with our attention, to what goes on in our minds at a deeper level than thought.

As to the basic character of electronic media, the first thing to note is that they vastly extend the power of writing to pull things out of time, into permanent records. Technology for recording sound evolved together with voice-communication, and soon encompassed video as well. Today mixed media is becoming normal for any sort of communication. And anything that we do on-line can be saved and reproduced. So the ability to write things down has exploded, with systems that automatically collect and analyze data on everything from subatomic particles to our personal

interests and buying habits. An incredible amount of detailed information is now captured and stored every second, without effort.

This means that far from undermining our sense of the world as a vast body of fact, the new media continually reinforce this picture of a given reality – the world written down. Yet at the same time, all this data-content is constantly being pulled back into a web of real-time personal interaction. A limitless archive of electronic information is accessible in a matter of seconds to anyone with an up-to-date phone, almost anywhere in the world. And the search tools we're all using every day are incomparably faster and more powerful than could have been imagined a few decades ago.

Texting and instant messaging turn writing itself into a means of immediate contact, often preferable to phone calls, since they let us keep in touch with each other throughout the day without interrupting anyone's business. We can set up our desktops to monitor dozens of different real-time feeds at once, letting our computers hook us into the unfolding present moment in many more ways than our brains can actually handle.

The point I'm making is that both the (A) and (B) sides of communication are being ramped up, together. The very multiplicity of new media calls attention to the different connection-systems and what each contributes to the functionality of our informational environment, even as the content carried by that environment grows exponentially.

Every time we sit down at the computer, we experience what it's like to be inside a world we collectively construct, in real-time interaction, where different kinds of information provide contexts for each other. Now that's also what real life is like. Both physically and at the level of human connection, all our experience is present-time communication. But as noted above, our brains train themselves to see through this web of interaction, constructing around us an objective world of people and things that exist in and of themselves, over time. The communications systems get taken for granted as we focus on their content. So instead of living in a buzzing interplay of different real-time sensory feeds, our brains create around us a relatively calm and stable scene in which we ourselves exist as objective entities among all these other familiar objects.

If our experience of being on-line can be distracting and disorientating, it's because we're not yet adapted to seeing through it in this way. This environment doesn't encourage us to be merely passive readers or observers. Instead it constantly tries to surprise us with new options, inviting us to select and interact, to participate in setting up new contexts that elicit further information, sending us off on another track, into new contexts. The power of choice we exercise constantly in life is here artificially enhanced, freed from constraint, made vivid and more narrowly focused.

Now just as the Greek alphabet promoted the unconscious illusion that the entire world could be written down, electronic media foster the illusion that our entire lives could be lived on-line. Not that anyone really believes this – yet as we video-chat with distant friends, it's easy to imagine a sci-fi world in which all human contact is "virtual". [13] On the other hand, the more of our time we spend in this realm of free and limitless connectivity, the more we're reminded how deeply different it is from the living, breathing, bodily world we come back to when we turn off the machine.

5 Communication and Community

Just because the electronic web imitates and facilitates so many aspects of our existence, it offers us a unique perspective on real life. Conceptually, the internet gives a concrete model for the world we actually experience, from inside, as a network of interconnected viewpoints – each of us assembling a unique set of inputs in our own present-time context, making connections that contribute to future contexts to be set up by others.

If we imagine the web objectively, from outside, we see millions of computers and other devices linked by cables and wireless channels, carrying massive flows of 0/1 bits – and that's all. From an external viewpoint the meaningful content of the web doesn't appear, since all those images, sounds and texts are reconstructed within the contexts set up by each individual device hooked into the network. Just so, the world each of us lives in is a reconstruction from our own viewpoint of our meaningful real-time interaction with other people and things. From outside we can imagine the reality of the universe and the social world. But what makes this objective data into observable information is what happens between us, in the contexts we make for each other.

Now pre-literate culture evolved entirely within this "between", in families and local communities with their oral traditions. The view from outside became possible only with writing, which opened up the much wider space of possibility in which our civilization grew. Yet until very recently, most people's lives still played out in the mainly oral and traditional culture of their local neighborhoods. The objective social reality operated at a higher level, organized through large impersonal institutions that defined themselves in written laws and charters – the churches and states, and eventually private corporations.

Only in the last century did the mass-production and marketing of consumer goods begin to transform daily life in most households and neighborhoods. Radio and TV brought the wide world into our homes with an immediacy that print media couldn't match, imitating the real-time rhythms of personal contact over the airwaves. As our horizons expanded to a national and global scale, the culture of local communities dwindled into marginality, and has now disappeared in much of the developed world.

Today many of us join on-line communities or discussion-groups, connecting with people who might be anywhere in the world, while few of us are acquainted with the other people living on our block. And at least superficially, the rapid expansion of electronic media seems to make this trend irreversible. I do more and more of my shopping on-line, and Skype makes it easier for me to see a friend in another country than to go outside and chat with my next-door neighbor.

But the theme of this essay is that our very absorption by the world of multimedia can also bring us back to ourselves. As our on-line existence becomes ever more interesting, it also makes explicit something that had always been taken for granted, while the oral culture of families and local communities was alive and well – the importance of being there with each other, in person. This no great insight; every kid knows there needs to be someone there, to see and hear and understand. It's obvious enough that the roots of human communication go deeper even than spoken words.

Yet as long as writing and printed text were the dominant media of cultural evolution, the depth and complexity of communications tended to go unnoticed.

Before we began adapting to electronic media, the conceptual frame through which we saw the world was polarized between individual and collective, the personal and the social world, the subjective view versus objectivity. It very rarely became an issue how people and things can be present to each other in contexts of meaningful communication, or what's needed to support the kinds of relationships we all depend on.

But over the last century we've become more sensitive to the "between" in our existence. Even in the intellectual world, still so deeply rooted in writing and print publication, there are signs that the depth of "I and Thou", the underlying dimension of participation, is starting to be recognized in many fields. [14] This isn't to devalue the kinds of thoughtful reflection and analysis made possible by off-line reading and writing. Nor does rediscovering the depth of interpersonal presence make any less valuable all the various ways we can connect through new media. But it is reminding us that we ultimately depend on the oral culture of friends and families and local communities as well.

When we think about the future of humanity, we don't usually think of communication or community as primary issues. But the health of our interpersonal environment is important, like the health of our natural environment. And both are very vulnerable now, under threat by the economic dominance of corporate institutions that seem structurally unable to recognize their kind of value.

In the heyday of TV, it used to seem inevitable that popular culture would fall entirely under the sway of this mass-scale commercialism. But even as the globalizing of culture continues, on-line we're all navigating through a network of personal webpages where individual creativity flourishes as it never has before, at remarkably low economic cost. In this cultural terra incognita we still operate, for now, within long-established frames of reference. But it could be fertile ground for growing new kinds of local engagement, along with global awareness.

Whether the effects of emerging technologies can be "steered" is an open question. In a world where a minor incident captured on someone's phone goes viral and gets seen the next day by a hundred million people – where our collective consciousness is alive on the web, and such random fluctuations are normal – it's not clear that our future evolution is predictable, or whether we can learn to evolve more purposefully. But at least we're now seeing something basic about ourselves that's been taken for granted and largely ignored throughout our history. I think that has to help.

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